

DIVISION OF ENVIRONMENTAL HEALTH AND COMMUNICABLE DISEASE PREVENTION

OFFICE OF SURVEILLANCE

BIOTERRORISM, COMMUNICABLE DISEASE, AND ENVIRONMENTAL SURVEILLANCE



2003 ANNUAL REPORT

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Introduction

The Office of Surveillance is responsible for the development and continuous quality improvement of an integrated statewide surveillance system for communicable, zoonotic and environmentally induced diseases and conditions. Data used in this report was gathered from disease, incident and condition reports made by medical providers, laboratories, hospitals, local public health agencies and others. Without vigilant reporting of disease, targeted and effective prevention and control measures cannot be implemented. We applaud the efforts of all reporters who make daily contributions of data so that we can identify trends in diseases and conditions. We are pleased to provide a detailed summary of our analysis of data reported in calendar year 2003.

This report is divided into three sections: Bio-Terrorism Surveillance, Communicable Disease Surveillance and Environmental Surveillance. Each section begins with a brief summary of data of interest for 2003 followed by detailed reports on specific diseases and conditions found throughout our integrated surveillance system. A table of reportable disease case counts by jurisdiction is located in the Communicable Disease section of the report. Where spatial analysis and use of Geographic Information Systems (GIS) was useful, maps have been provided to depict the data. Hyperlinks to additional information are included throughout the document.

This year's report was coordinated by Angela Krutsinger, Ph.D., Bio-Terrorism Surveillance Coordinator and compiled by Marilyn Nobbman. Research and epidemiology staff in the Office of Surveillance provided the analyses and text for the report with the capable assistance of our office support staff.

We thank our reviewers, Brian Quinn, Public Information Specialist in the Division of Environmental Health and Communicable Disease Prevention and Dr. Bao-Ping Zhu, State Epidemiologist, Office of Epidemiology, for their thorough review and helpful comments.

We invite your questions and comments on this report. We can be reached at (573) 751-9071 or Toll-free (866) 628-9891, by Fax at (573) 751-6417, or email Konstl@dhss.mo.gov. Put in subject line "2003 Annual Report."

Thank you for taking the time to read this report.

Lyn C. Konstant, Ph.D.
Administrator, Office of Surveillance



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Section A - Bio-Terrorism Surveillance

Missouri's Bio-Terrorism Surveillance System

Missouri was the first state to provide statewide Bio-Terrorism Surveillance (BTS) in response to the terrorist attacks of September 11, 2001, this system has evolved several times since its inception. The current system is modeled after the elements found in the United States military's bio-terrorism surveillance system to collect comprehensive, timely information with the capability of moving into heightened surveillance or "high alert" mode or status when suspicious or negative trends are revealed.

The recognition of two vital concepts led to the changes instituted to our BTS system. First, that Bio-Terrorism Surveillance is actually the comprehensive review of any and all information that could possibly fall under the term surveillance and its evaluation using measures of importance. Second, that there are distinctly different levels of surveillance and that the constant maintenance of high alert status can cause deterioration in the participation of the reporters involved and the validity of their observations. This included developing partnerships to incorporate various data streams that would allow better detection of trends and aberrations, determine the scope and magnitude of bio-terrorist events and public health threats seen in Missouri and improve the reliability, to include timeliness, by using information received from BTS Sentinel sites to identify level I, II and III alerts and provide instant notification of level III alerts to the appropriate personnel of our Bio-Terrorism Surveillance partners [Sentinels, Guardians, Aces, Guides and Allies](#) so that timely interventions may be initiated to minimize their impact and to save lives.

One example of how the various BTS partners have been able to collaborate to improve prevention and intervention is the [WNV/Neurologic MAP](#) which helped identified communities that needed to increase their testing for West Nile virus (WNV) by mapping reports of neurological symptoms and meningitis, the number of WNV tests conducted and populations.

Site feedback reporting was also further developed and improved so that at the close of each month, each site receives two monthly reports that present reported counts and signals/flags as well as how the monthly data have deviated from other months across the life of the database. Examples of the feedback report and monthly average report can be viewed (for December, 2003 using state level data) at [Feedback Report](#) and [Monthly Average Report](#). Future additions include web-based data entry, analysis, and reporting as well as automated, electronic collection of both hospital and laboratory data to attain the "real time" capability that is so desperately needed for bio-terrorism/public health threat surveillance.

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Section A - Bio-Terrorism Surveillance

Improved Reporting Frequencies

In the first six months of 2003, 811 sites completed and forwarded 45,626 Bio-Terrorism Surveillance reports, reflecting an average of eight to nine reports per month being submitted by each site. In May 2003, the number of sites was reduced to 87 Sentinel sites, strategically located across the state with high reporting frequency histories in order to improve the quality and reliability of BTS data. From May to December 2003, 75 of the BTS sites (Sentinels) submitted a total of 10,308 BTS reports or an average of 24 per month per site. Reporting has significantly improved the frequency and consistency of BT Surveillance data as shown in the figures below.

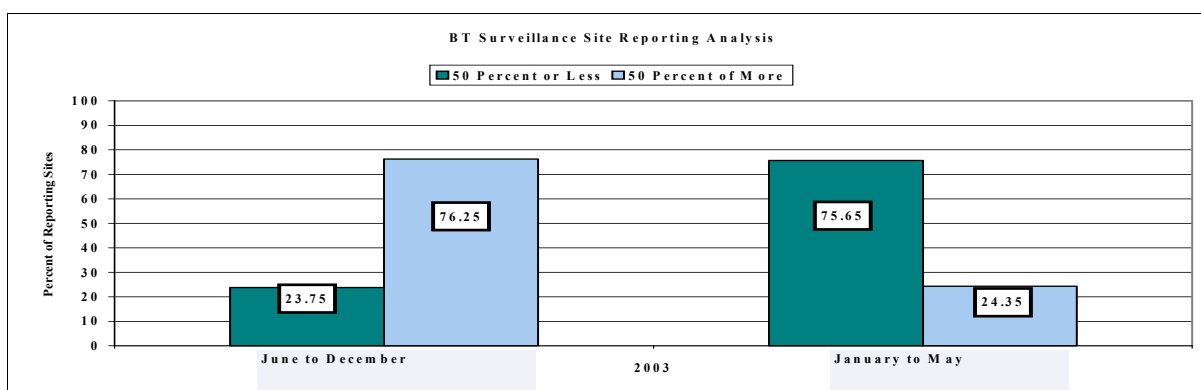


Figure 1A: Analysis of BTS Site Reporting Frequencies for 2003

Figure 1A graphically demonstrates that from January to May 2003 about 75 percent of all reporting sites reported less than 50 percent of the time and that during the last half of 2003, the pattern of sites' reporting frequencies became almost exactly reversed. **Figure 2A** reflects the number of the 87 Sentinel BTS sites that reported for each month. These significant improvements in reporting consistency correspondingly improved the validity and usability of BT Surveillance data as well as its analytical value. ([Site Location Map](#))

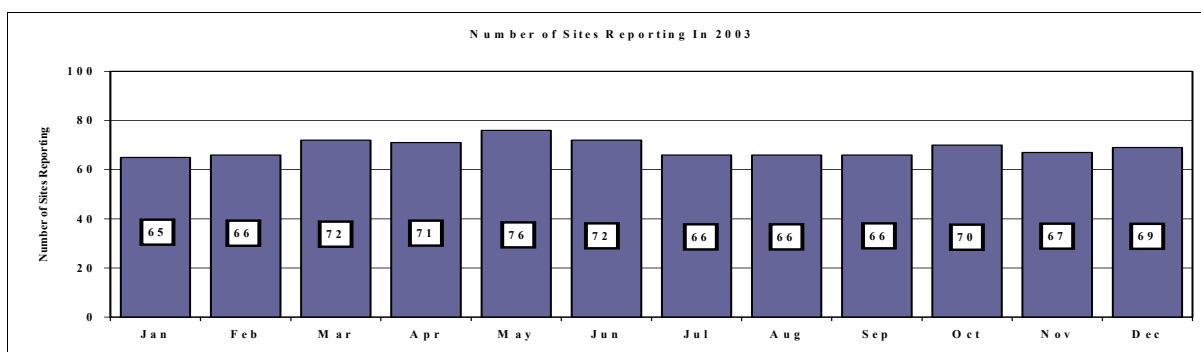


Figure 2A: Number of the 87 BTS Sentinel Sites Reporting

Section A - Bio-Terrorism Surveillance

Distribution of Data Collected

The distribution across the eight major syndromic categories showed that over two-thirds of all 2003 syndromic data reported fell into the gastrointestinal and respiratory categories while neurologic, rashes, fevers and influenza-like-illness (ILI) accounted for the majority of the remaining one-third (**Figure 3A**).

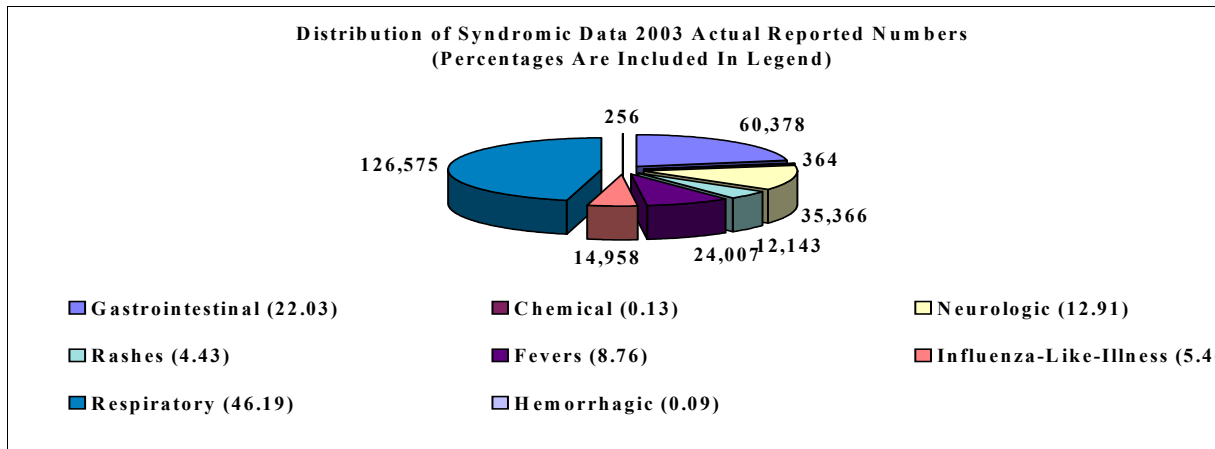


Figure 3A: Distribution of Syndromic Counts Reported by BT Surveillance Sites

Although the chemical hemorrhagic categories came in well under 1% in their actual numbers, they still managed to have some significant flagging results (**Figure 4A**) due to their automatic flagging by the BTS system to help catch Category 1 reportable diseases and identify chemical incidents at the earliest juncture (**Figure 5A**).

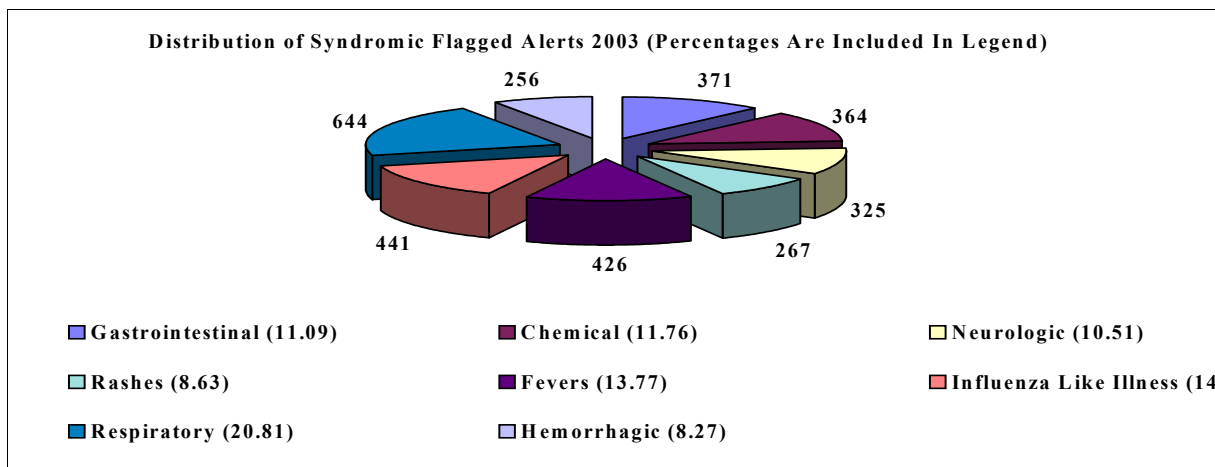


Figure 4A: Distribution of Syndromic Flagged Alerts

Section A - Bio-Terrorism Surveillance

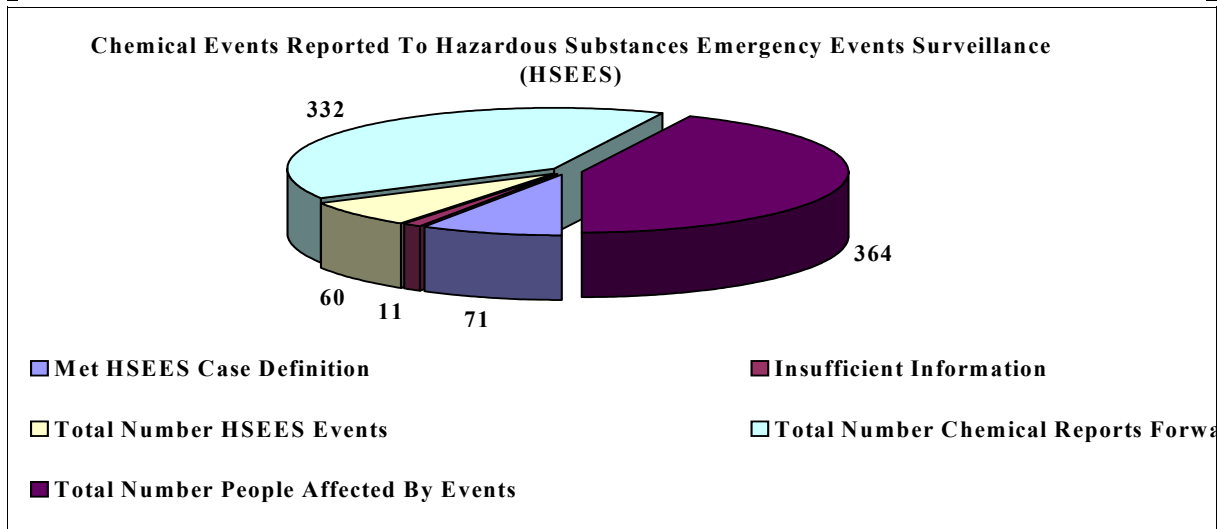


Figure 5A: BTS chemical events reported to Hazardous Substances Emergency Events Surveillance (HSEES)

The above chart displays the breakdown of the 364 chemical reports related to 332 chemical incidents that were received through the Bio-terrorism Surveillance System and forwarded to the Hazardous Substances Emergency Events Surveillance program to determine if they met their case definition of a chemical event. Seventy-one of those 332 reports immediately met the HSEES case definition and were further investigated by the HSEES Coordinator who determined that 11 had insufficient information available for classification and classified the remaining 60 as actual Hazardous Substances Emergency Events.

Improved Data Analysis and Reporting

This year saw a variety of improvements to Missouri's Bio-Terrorism Surveillance System, not the least of which was a new data analysis procedure that increased the accuracy of determining aberrations and/or elevated trends for both syndromic and non-syndromic reported data and decreased the number of superfluous flags and follow-up inquiries by using two basic time groupings – month and day of week – to analyze the data in terms of deviations from computed means. Simply stated, if reported counts exceed this defined statistical criteria, a signal or flag is produced and then reviewed to determine the need to follow-up with the site to determine if anything unusual either has occurred or is occurring, or if it is something already identified by any of the BTS partners or just a natural occurrence, such as pollen season.

Section A - Bio-Terrorism Surveillance

Analysis of Follow-Up Contacts

617 cases of fifteen different reportable diseases were identified in 2003 (**Figure 6A**).

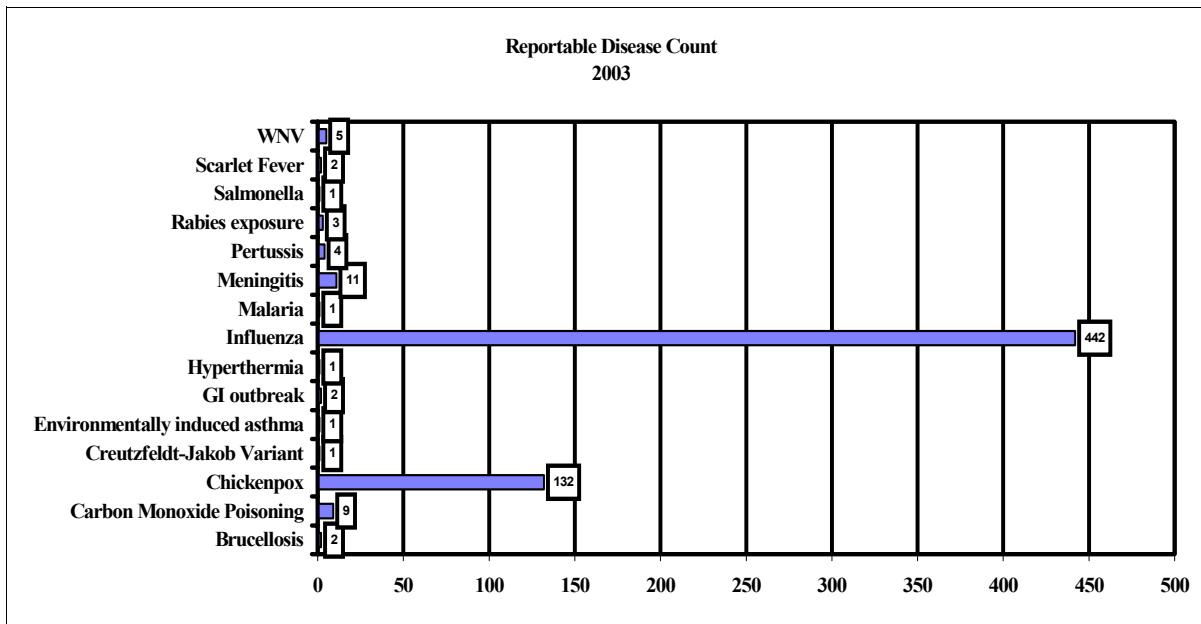


Figure 6A: Total number of reportable diseases found through Bio-Terrorism Surveillance.

The 55,934 BTS reports submitted generated 2,557 flags (4.6%) and 1,141 of these (2%) were determined to require a follow-up inquiry, which yielded an additional 96 significant findings such as unusual rashes, school closures due to illness, etc. (**Figure 7A**).

Notifications of all the reportable disease cases and significant findings discovered through the BTS system were immediately sent to the appropriate Local Public Health Agencies and regional Communicable Disease staff. These communications improved collaborative relationships and response times and also assisted field staff with a variety of disease investigations.

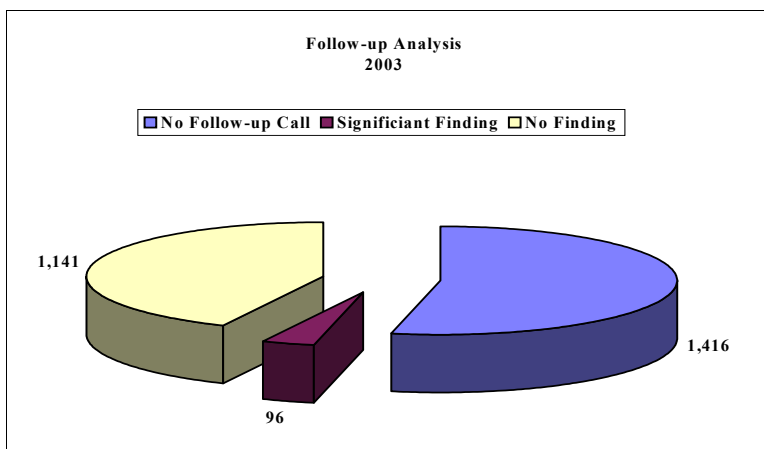


Figure 7A: Flags Requiring Follow-Up



Section A - Bio-Terrorism Surveillance

Trends and Elevations of 2003

In general, syndromic categories that produced a significantly different percentage of signals than a percentage of counts suggests that the reported data for these categories were significantly different than what had been previously reported. For the last half of 2003, the syndromic categories of gastrointestinal and respiratory tended to have counts somewhat below what was seen previously. This does not mean that aberrations and/or elevations for these categories were not recorded. It simply means these categories may not have been deviating as far from history as some other categories. However, for the gastrointestinal category ([Gastrointestinal Syndrome](#)) significant elevations were seen in the summer and early fall and elevations in the respiratory category were seen in September and December of 2003 ([Respiratory Syndrome](#)).

During the last half of 2003, the neurological category ([Neurological Syndrome](#)) resulted in about the same proportion of signals as counts, and was the most elevated during the summer. The rash category was more than likely marginally elevated relative to previous data and was most significant in the May to September time frame ([Rash Syndrome](#)).

The categories of fever of unknown origin ([Fever Syndrome](#)) and influenza-like-illness ([Influenza-Like Illness](#)) were the most elevated of all the syndromes, with the vast majority of aberrations for both of these categories seen in December 2003. An earlier-than-normal occurrence of the “flu” season was identified first by the BTS system and substantiated by the Influenza Sentinel System and positive lab results. Heightened surveillance measures were immediately implemented, including weekly analysis of the trends and geospatial location of the ILI data ([ILI Trend Direction](#) and [ILI Percent Change](#)). It is also important to note that improved awareness as to the need for the reporting of the ILI category and the rapid “flu” test becoming a covered medical expense must not be overlooked in reviewing the impact of these peak numbers.

Every chemical and hemorrhagic occurrence reported to BTS automatically generates a signal or flag that requires follow-up. This means that in every instance, the reporting site is contacted to determine if an abnormality has been seen that would suggest exposure to either a chemical or biological agent. As mentioned previously, each chemical report is forwarded to HSEES for further investigation but the BTS staff follow up on each of the hemorrhagic reports, the majority of which have been reporting errors.

Section A - Bio-Terrorism Surveillance

Sentinel and HESS Sites

The current BTS sites include 14 clinics and physicians, 64 hospitals, eight schools, and one university. Of the 14 clinics and physicians, five clinics report both syndromic and non-syndromic information, five clinics report only syndromic data and the four physicians report only syndromic information. Out of the 64 hospitals, 50 report both syndromic and non-syndromic information, 13 report only non-syndromic data and one hospital reports only syndromic information. Five of the schools report both syndromic and non-syndromic information and three report only syndromic information, and the university reporting to BTS submits both syndromic and non-syndromic data.

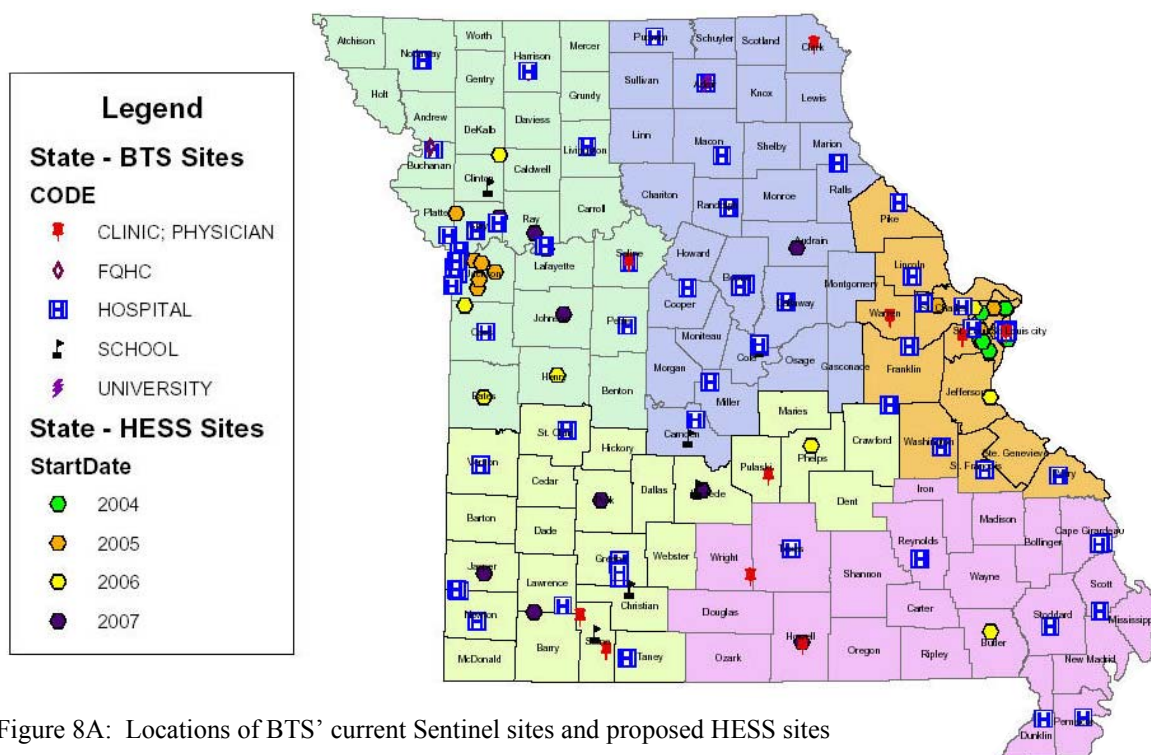


Figure 8A: Locations of BTS' current Sentinel sites and proposed HESS sites

The Missouri state map above presents the geographic distribution of the current 87 Sentinel sites selected to report to BT Surveillance as well as the proposed sites scheduled to start reporting via the Hospital Electronic Surveillance System (HESS), once it is available. HESS will provide us with vital demographic information that will help rule out and identify the causes of aberrations and trends without requiring follow-up calls, something that we cannot currently do with only aggregate information. Most importantly, HESS will provide some "real-time" capabilities to Bio-Terrorism Surveillance in the automated receipt of data and identification of unusual trends and aberrations that signal public health threats and bio-terrorist events.



Section B - Communicable Disease Surveillance

To improve our disease reporting system, health care providers, in cooperation with our local public agencies, are encouraged to report conditions found in our communicable disease reporting rule, [19 CSR 20-20.020](#). The more accurately disease incidence data are reported, analyzed and disseminated back to the local users, Missourians could realize the benefit of a comprehensive community planning process to reduce the occurrence of communicable disease.

There were two communicable diseases that affected Missourians in 2003 at levels that were well above normal expectations.

Influenza appeared earlier than usual in 2003 and impacted the state with a dramatic four-fold increase as compared to 2002. Also, the components found in the Influenza vaccine were less effective due to the virus mutating (creating a drift variant). This variant caused illness in a percentage of those who received the Influenza vaccination, as those who received the immunization were afforded only partial protection to the drift variant of the Influenza virus.

Missouri also realized in 2003 a continued rise in the number of Pertussis cases, particularly in the Northwest and Central Health Regions in Missouri. Pertussis has been on the rise in Missouri since 1998, and it has dramatically risen in the last two years. Unlike last year, this year's incidence affected Missourians equally across all age groups; therefore, health care providers should again be cognizant of patients who are presenting with long periods of unexplained cough.

The remainder of communicable conditions described in this section were those that affected Missourians in numbers that qualified them as the Top 15 diseases reported in Missouri in 2003.

Should you need additional data on these or other conditions not found within this report please contact the Communicable Disease Surveillance Unit within the Office of Surveillance at (573) 751-9071 or email Ray Juneau at juneau@dhss.mo.gov.

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Section B - Communicable Disease Surveillance

Campylobacteriosis

Missouri Incidence. Campylobacteriosis is one of the most common communicable diseases in Missouri. In 2003, there were 655 reported cases of campylobacteriosis for a rate of 11.71 per 100,000 population (**Table 1B**).

In comparison to combined 1998-2002 data, the rate of reported campylobacteriosis significantly increased by 10% ($p < .05$).

Considering only those cases with reported socio-demographics, the 2003 rates of reported campylobacteriosis were similar for males and females (**Table 1B**).

Whites, individuals less than 13 years of age, and the Southwest Health Region had the highest rates of campylobacteriosis for their respective socio-demographic (**Table 1B**).
[NOTE: 36% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported campylobacteriosis significantly increased among females ($p < .001$) and individuals aged 40-49 ($p < .05$), 50-59 ($p < .001$), and 60+ ($p < .001$) (**Table 1B**).

Additional Missouri Information

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Table 1B - Campylobacteriosis Comparative Statistics by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
<i>Total</i>	655	11.71	10.66
SEX ¹			
<i>Male</i>	314	11.54	11.75
<i>Female</i>	340	11.83	9.53
RACE/ETHNICITY ^{1,3}			
<i>White</i>	385	7.99	0.27
<i>Black</i>	25	3.81	0.06
<i>Hispanic</i>	6	5.06	0.67
AGE GROUP ¹			
<i><=12 yrs</i>	177	17.41	15.80
<i>13-19 yrs</i>	32	5.54	7.06
<i>20-29 yrs</i>	70	9.57	10.60
<i>30-39 yrs</i>	86	10.49	10.71
<i>40-49 yrs</i>	105	12.50	9.72
<i>50-59 yrs</i>	87	13.90	8.60
<i>60+ yrs</i>	88	8.95	4.33
HEALTH REGION ¹			
<i>Northwest</i>	75	5.14	7.91
<i>Eastern</i>	302	14.13	10.45
<i>Central</i>	67	10.79	10.43
<i>Southeast</i>	79	17.19	12.54
<i>Southwest</i>	132	14.37	14.66

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

⁴ Rates are expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Campylobacteriosis - Continued

Additionally, the rate of reported campylobacteriosis significantly increased in the Eastern ($p < .001$) and Southeast ($p < .05$) Health Regions while significantly decreasing in the Northwest Health Region ($p < .001$) (**Table 1B on Page 13**). [NOTE: Due to missing data, 2003 data were not compared to 1998-2003 for race/ethnicity.]

Comparison to National Data. Since 1994, the annual rate in Missouri of reported campylobacteriosis has remained relatively stable, fluctuating between 9.5 and 12.4 cases per 100,000 (**Figure 1B**). Nationally, campylobacteriosis is not a reportable disease; therefore, comparative data are unavailable.

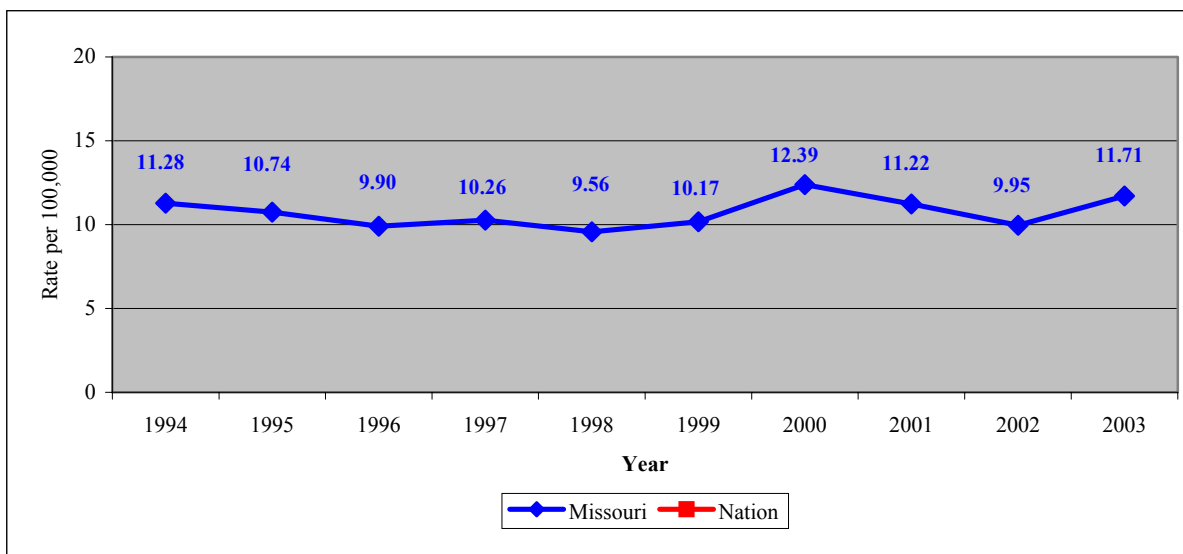


Figure 1B - Campylobacteriosis Rates of Reported Cases, Missouri, 1994-2003

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Section B - Communicable Disease Surveillance

Chlamydia

Missouri Incidence. In 2003, 18,570 cases of Chlamydia were reported in Missouri residents. Of these cases, 14,750 (79.4%) were in females. Furthermore, in the previous five years, females accounted for 85.1 percent of reported Chlamydia cases. In 2003, as well as in each of the subsequent five years, African Americans had a higher number of cases than any other race.

The 2003 case rate in African Americans was 1,313.3 per 100,000 population, which is more than ten times that of Whites (123.9). It should be noted that race was not indicated in 4,041 (28.1%) cases during 2003 and, if race were to be determined in these cases, the resulting redistribution would be similar (**Table 2B**).

Demographically by age group, the highest case rates were found in the 15-19 and 20-24 groups (1,732.9 and 1,911.8 per 100,000 population, respectively), which are noticeably higher than their corresponding five-year mean rates. Persons aged 15-29 years had 16,496 (88.8%) reported cases in 2003, which is similar to the previous five years' rates, whereas persons in the 15-29 age groups accounted for an average of 88.6% of the reported cases. This fact, paired with the high case counts in women, is worthy of note due to the reproductive health problems that can occur in women with Chlamydial infections (**Table 2B**).

Table 2B - Chlamydia Comparative Statistics, by Socio-demographic Category, Missouri

	2003 Case Count	2003 Case Rate ^{1,2}	5 year Mean Rate ¹
Race			
American Indian/Eskimo	29	115.6	59.0
Asian/Pacific Islander	92	142.0	100.7
Black	8,266	1,313.3	942.6
White	5,883	123.9	87.4
Other	259	563.9	354.0
Unknown	4,041	4,924.4	4,384.1
Sex			
Male	3,820	140.4	76.4
Female	14,750	513.0	411.9
Age Group			
<10	43	5.6	9.5
10 - 14	303	73.5	81.1
15 - 19	7,162	1,732.9	1,440.9
20 - 24	7,064	1,911.8	1,305.3
25 - 29	2,270	626.5	427.5
30 - 34	881	234.0	152.5
35 - 39	387	87.3	59.1
40 - 44	205	46.1	28.4
45 - 54	133	17.9	10.3
55 - 64	20	3.9	3.0
65 +	11	1.5	3.0
Unknown	91		
Health Region³			
City of St. Louis	3,502	1,005.8	868.4
St. Louis County	3,235	318.3	255.0
Kansas City	3,720	842.5	642.9
Outstate	8,113	214.1	144.3
Missouri	18,570	331.9	248.8

¹ All rates expressed as cases per 100,000 population

² Bold print numerals indicate rates that have exceeded the 5-year mean rate

³ Outstate includes all areas except St. Louis County, St. Louis City and Kansas City



Section B - Communicable Disease Surveillance

Chlamydia - Continued

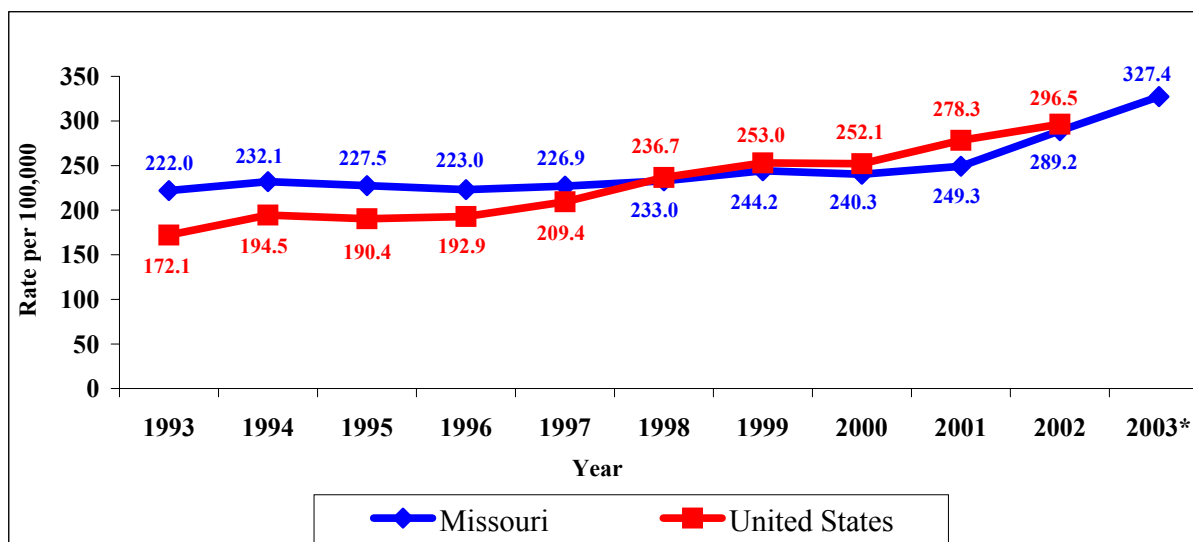
Geographically, St. Louis City reported 3,502 cases in 2003 with an associated case rate of 1,005.8 per 100,000 residents. In 2002, St. Louis City ranked 5th highest in Chlamydia case rates (920.8) in the nation within cities of more than 200,000 residents. Kansas City ranked 12th in the same study with a rate of 740.9 per 100,000 residents. Moreover, the 2003 case rates for both St. Louis and Kansas City are higher than their 2002 totals. Case rates for each geographic region, which are listed in (**Table 2B on Page 15**), have exceeded their corresponding five-year mean rates.

ADDITIONAL INFORMATION

[Case Definition](#)

[Fact Sheet](#)

Comparison to National Data. Missouri's rate is higher than the national average from 1993 to 1997 with a rate less than or equal to the national rate from 1998 to 2002. At the time of publication, national average case rates were not available for 2003, so a rate comparison between Missouri and the nation cannot be presented for that year. However, Missouri has roughly paralleled the national trend in previous years of case rates, which show an increasing trend in recent years (**Figure 2B**).



*National data for 2003 were unavailable at the time of publication

Figure 2B - Chlamydia Rates of Reported Cases, Missouri versus United States, 1993-2003

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Section B - Communicable Disease Surveillance

Escherichia coli (E. coli) O157:H7

Missouri Incidence. In 2003, there were 85 reported cases of *E. coli* O157:H7 infection in Missouri residents for a rate of 1.52 per 100,000 population (**Table 3B**). In comparison to combined 1998-2002 data, the rate of reported *E. coli* O157:H7 infection increased by 22%, which is statistically insignificant ($p>.10$).

Considering only those cases with reported socio-demographics, the 2003 rates of reported *E. coli* O157:H7 infection were similar for males and females (**Table 3B**).

Whites had a significantly higher rate of *E. coli* O157:H7 infection than did African Americans ($p<.05$). Additionally, individuals less than 13 years of age and those in the Northwest Health Region had the highest rates of *E. coli* O157:H7 infection for their respective socio-demographic (**Table 3B**). [NOTE: 33% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported *E. coli* O157:H7 infection significantly increased among females ($p<.05$) and individuals aged 50-59 ($p<.05$) (**Table 3B**). Additionally, the rate of reported *E. coli* O157:H7 infection significantly increased in the Northwest Health Region ($p<.001$). [NOTE: Due to missing data, 2003 data were not compared to 1998-2003 for race/ethnicity.]

Additional Missouri Information

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Table 3B - *E. coli* O157:H7 Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	85	1.52	1.25
SEX ¹			
Male	36	1.32	1.35
Female	49	1.70	1.15
RACE/ETHNICITY ^{1,3}			
White	55	1.14	0.08
Black	2	0.31	0.09
Hispanic	0	0.00	0.00
AGE GROUP ¹			
<=12 yrs	36	3.54	2.66
13-19 yrs	8	1.38	1.49
20-29 yrs	7	0.96	1.15
30-39 yrs	11	1.34	0.71
40-49 yrs	2	0.24	0.55
50-59 yrs	12	1.92	0.99
60+ yrs	9	0.91	0.71
HEALTH REGION ¹			
Northwest	30	2.06	0.89
Eastern	32	1.50	1.46
Central	12	1.93	1.09
Southeast	4	0.87	1.04
Southwest	6	0.65	1.46

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

⁴ Rates expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Escherichia Coli (E. Coli) O157:H7 - Continued

Comparison to National Data. Missouri's annual rate of reported *E. coli* O157:H7 infection has generally increased since 1994 (**Figure 3B**). The overall values and trends in Missouri's rates are similar to the national data for reported *E. coli* O157:H7 infections.

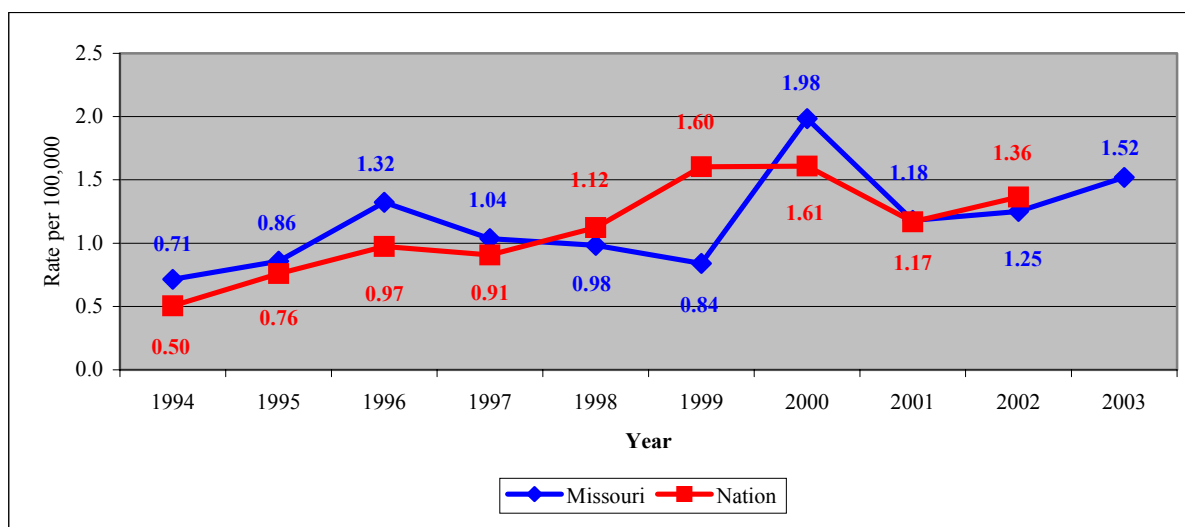


Figure 3B - *E. Coli* O157:H7 Rates of Reported Cases, Missouri versus United States, 1994-2003

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Section B - Communicable Disease Surveillance

Giardiasis

Missouri Incidence. In Missouri residents in 2003, there were 515 reported cases of giardiasis for a rate of 9.20 per 100,000 population (**Table 4B**). In comparison to combined 1998-2002 data, the rate of reported giardiasis significantly decreased by 30% ($p<.001$).

Considering only those cases with reported socio-demographics, the 2003 rate of reported giardiasis was significantly higher for males than females ($p<.05$) (**Table 4B**). Hispanics/Latinos, individuals less than 13 years of age, and the Eastern and Central Health Regions had the highest rates of giardiasis for their respective socio-demographic. [NOTE: 46% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported giardiasis significantly decreased among males ($p<.001$), females ($p<.001$) and individuals aged less than 13 ($p<.001$), 20-29 ($p<.05$), 30-39 ($p<.001$), and 40-49 ($p<.01$) (**Table 4B**).

Additionally, the rate of reported giardiasis significantly decreased in the Eastern ($p<.001$), Southeast ($p<.01$), and Southwest ($p<.05$) Health Regions (**Table 4B**). [NOTE: Due to missing data, 2003 data were not compared to 1998-2003 for race/ethnicity.]

Additional Missouri Information

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Table 4B - Giardiasis Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	515	9.20	13.09
SEX ¹			
Male	277	10.18	14.18
Female	235	8.17	11.99
RACE/ETHNICITY ^{1,3}			
White	245	5.08	0.24
Black	22	3.36	0.12
Hispanic	10	8.43	0.00
AGE GROUP ¹			
<=12 yrs	216	21.25	29.22
13-19 yrs	35	6.06	8.13
20-29 yrs	58	7.93	11.15
30-39 yrs	73	8.91	15.45
40-49 yrs	52	6.19	9.48
50-59 yrs	34	5.43	6.55
60+ yrs	41	4.17	4.41
HEALTH REGION ¹			
Northwest	116	7.95	7.87
Eastern	224	10.48	18.13
Central	64	10.30	12.60
Southeast	21	4.57	8.23
Southwest	89	9.69	12.35

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

⁴ Rates expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Giardiasis - Continued

Comparison to National Data. Giardiasis did not become a nationally reportable condition until 2002, so comparative data is available for that year only. The annual rate of reported giardiasis in Missouri slightly increased from 1994 to 2000, but has markedly declined since 2000. In 2002, Missouri's rate of reported giardiasis was 21% higher than the national rate (Figure 4B).

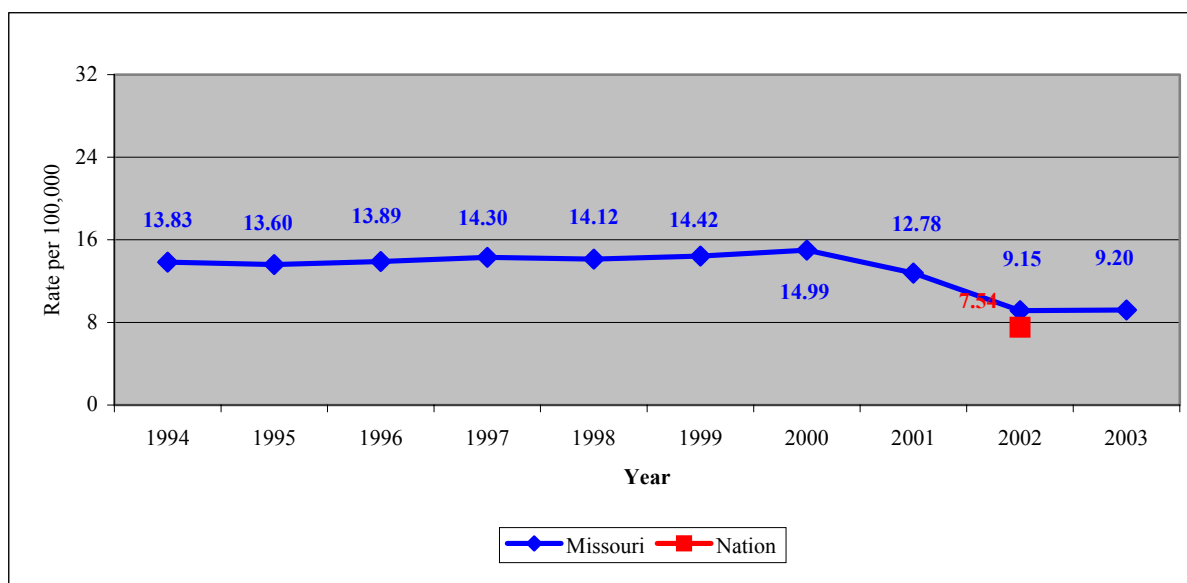


Figure 4B - Giardiasis Rates of Reported Cases, Missouri versus United States, 1994-2003

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Section B - Communicable Disease Surveillance

Gonorrhea

Missouri Incidence. In 2003, 8,792 cases of Gonorrhea were reported in Missouri residents. Of these cases, 4,794 (54.5%) were in females. Furthermore, in the previous five years, females accounted for 52.5 percent of reported Gonorrhea cases.

In 2003, as well as in each of the subsequent five years, African Americans had a higher number of cases than any other race. The 2003 rate in African Americans was 947.7 per 100,000 population, which is more than 35 times that of Whites (26.8). It should be noted that race was not indicated in 1,449 (16.5%) cases during 2003 and, if race were to be determined in these cases, the resulting redistribution would be similar (**Table 5B**).

Demographically by age group, the highest rates were found in the 15-19 and 20-24 groups, which were 594.5 and 773.5 per 100,000 population respectively, which are slightly below and slightly higher than their respective five-year mean rates. Persons aged 15-29 years had 6,690 (76.1%) reported cases in 2003, which is similar to the previous five years' rates, whereas persons in the 15-29 age groups accounted for an average of 91.7% of the reported cases (**Table 5B**).

Table 5B - Gonorrhea Comparative Statistics, by Socio-demographic Category, Missouri

	2003 Case Count	2003 Rate ^{1,2}	5-year Mean Rate ¹
Race			
American Indian/ Eskimo	12	47.9	30.3
Asian/Pacific Islander	25	38.6	42.9
Black	5,965	947.7	1,008.9
White	1,271	26.8	22.7
Other	70	152.4	119.8
Unknown	1,449	1,765.8	1,611.0
Sex			
Male	3,998	147.0	154.3
Female	4,794	166.7	161.6
Age Group			
<10	14	1.8	4.6
10 - 14	128	31.1	37.7
15 - 19	2,457	594.5	658.8
20 - 24	2,858	773.5	730.4
25 - 29	1,375	379.5	361.8
30 - 34	723	192.1	191.9
35 - 39	501	113.0	119.4
40 - 44	356	80.1	73.3
45 - 54	272	36.6	31.6
55 - 64	57	11.2	9.7
65 +	13	1.7	2.3
Unknown	38		
Health Region³			
City of St. Louis	2,545	730.9	880.5
St. Louis County	1,717	168.9	175.9
Kansas City	2,367	536.1	531.5
Outstate	2,163	57.1	43.3
Missouri Totals	8,792	157.1	158.0

¹ All rates expressed as cases per 100,000 population

² Bold print numerals indicate rates that have exceeded the 5-year mean rate

³ Outstate includes all areas except St. Louis County, St. Louis City and Kansas City

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Section B - Communicable Disease Surveillance

Gonorrhea - Continued

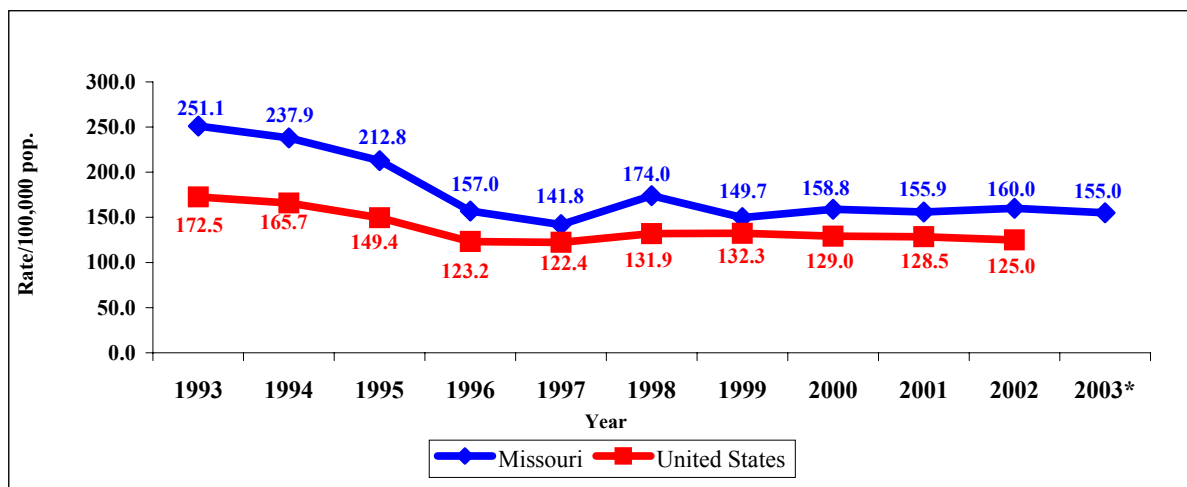
This fact, paired with the high case counts in women, is worthy of note due to the reproductive health problems that can occur in women with Gonococcal infections (**Table 5B on Page 21**).

ADDITIONAL INFORMATION

[Case Definition](#)
[Fact Sheet](#)

Geographically, St. Louis City reported 2,542 cases in 2003 with an associated case rate of 730.9 per 100,000 residents. In 2002, St. Louis City ranked 1st in Gonorrhea case rates (786.1) in the nation within cities of more than 200,000 residents. Kansas City ranked 7th in the same study with a rate of 580.9 per 100,000 residents. Moreover, the 2003 case rates for both St. Louis and Kansas City are lower than their 2002 totals. Case rates for the St. Louis metropolitan area are lower than their corresponding five-year mean rates (**Table 5B on Page 21**).

Comparison to National Data. Missouri's rate for Gonorrhea has been higher than the national average from 1993 to present. At the time of publication, national average case rates were not available for 2003, so a rate comparison between Missouri and the nation cannot be presented for that year. However, Missouri has roughly paralleled the national trend in previous years of case rates that are maintaining steady each year (**Figure 5B**).



*National data for 2003 was unavailable at the time of publications.

Figure 5B - Gonorrhea Rates of Reported Cases, Missouri versus United States, 1993-2003

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Section B - Communicable Disease Surveillance

Hepatitis B, Acute

Missouri Incidence. In 2003, there were 248 reported cases of acute Hepatitis B in Missouri residents for a rate of 4.43 per 100,000 population (**Table 6B**). In comparison to combined 1998-2002 data, the rate of reported acute Hepatitis B significantly increased by 41% ($p<.001$).

Considering only those cases with reported socio-demographics, the 2003 rate of reported acute Hepatitis B was significantly higher for males than females ($p<.001$) (**Table 6B**).

African Americans had a significantly higher rate of acute Hepatitis B than did Whites ($p<.001$). Hispanics/Latinos, individuals aged 30-39 years, and the Southwest Health Region had the highest rates of acute Hepatitis B for their respective socio-demographic. [NOTE: 52% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported acute Hepatitis B significantly increased among males ($p<.001$) and individuals aged less than 13 ($p<.001$), 20-29 ($p<.05$), 30-39 ($p<.001$), 40-49 ($p<.001$), and 50-59 ($p<.01$) (**Table 6B**).

Additionally, the rate of reported acute Hepatitis B significantly increased in the Northwest ($p<.001$), Southeast ($p<.05$), and Southwest ($p<.001$) Health Regions (**Table 6B**). [NOTE: Due to missing data, 2003 data were not compared to 1998-2003 for race/ethnicity.]

Table 6B - Hepatitis B (Acute) Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	248	4.43	3.13
SEX ¹			
Male	158	5.81	3.61
Female	88	3.06	2.66
RACE/ETHNICITY ^{1,3}			
White	87	1.81	2.50
Black	26	3.97	7.29
Hispanic	5	4.22	2.02
AGE GROUP ¹			
<=12 yrs	0	0.00	2.01
13-19 yrs	9	1.56	1.77
20-29 yrs	47	6.42	4.35
30-39 yrs	70	8.54	5.20
40-49 yrs	66	7.86	3.83
50-59 yrs	33	5.27	2.88
60+ yrs	18	1.83	1.24
HEALTH REGION ¹			
Northwest	74	5.07	2.29
Eastern	77	3.60	3.90
Central	11	1.77	1.96
Southeast	21	4.57	2.44
Southwest	61	6.64	3.83

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

⁴ Rates expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Hepatitis B, Acute - Continued

Comparison to National Data. Prior to 2003, the rate of reported acute Hepatitis B had consistently declined, decreasing by 78% from 1994 to 2002 (**Figure 6B**). From 1998-2002, Missouri's rates of reported acute Hepatitis B were very similar to the national rates, which were also declining. However, Missouri has experienced an increase in incidence for acute Hepatitis B in 2003.

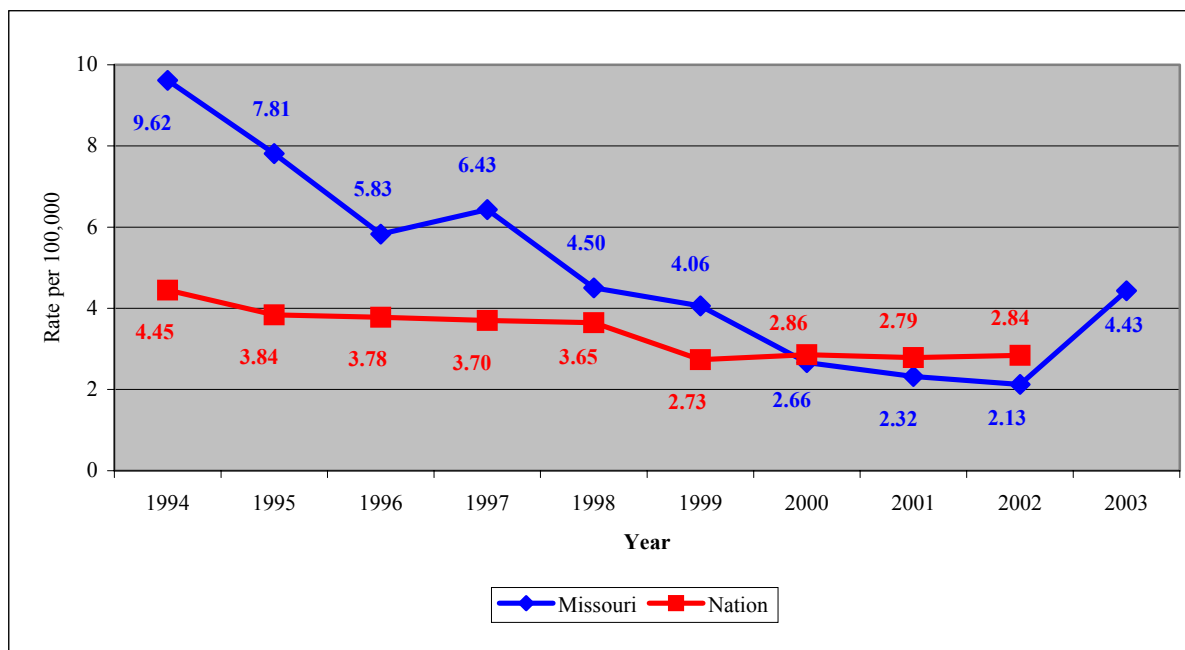


Figure 6B - Hepatitis B (Acute) Rates of Reported Cases, Missouri versus United States, 1994-2003

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Section B - Communicable Disease Surveillance

Hepatitis C, Chronic

Missouri Incidence. Chronic Hepatitis C is one of the most common communicable diseases in Missouri. In 2003, there were 2,813 reported cases of chronic Hepatitis C for a rate of 50.28 per 100,000 population (**Table 7B**). In comparison to combined 1999-2002 data, the rate of reported chronic Hepatitis C significantly decreased by 45% ($p<.001$).

Considering only those cases with reported socio-demographics, the 2003 rate of reported chronic Hepatitis C was significantly higher for males than females ($p<.001$) (**Table 7B**).

African Americans had a significantly higher rate of chronic Hepatitis C than did Whites ($p<.001$). Individuals aged 40-49 years and the Southwest Health Region had the highest rates of chronic Hepatitis C for their respective socio-demographic (**Table 7B**). [NOTE: 65% of cases did not have a race/ethnicity designation.]

In comparison to combined 1999-2002 data, the 2003 rates of reported chronic Hepatitis C significantly decreased among both sexes, all age groups, and all health regions (**Table 7B**). [NOTE: Due to missing data, 2003 data were not compared to 1999-2003 for race/ethnicity.]

Additional Missouri Information

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Table 7B - Hepatitis C (Chronic) Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	2,813	50.28	90.65
SEX ¹			
Male	1,695	62.31	115.00
Female	1,077	37.46	65.91
RACE/ETHNICITY ^{1,3}			
White	744	15.44	30.90
Black	229	34.94	58.33
Hispanic	8	6.75	12.65
AGE GROUP ¹			
<=12 yrs	13	1.28	3.37
13-19 yrs	27	4.67	9.56
20-29 yrs	189	25.83	47.72
30-39 yrs	468	57.10	141.98
40-49 yrs	1,218	145.01	250.94
50-59 yrs	617	98.58	125.97
60+ yrs	234	23.79	38.27
HEALTH REGION ¹			
Northwest	728	49.89	104.78
Eastern	951	44.50	81.16
Central	99	15.94	75.91
Southeast	259	56.37	86.63
Southwest	737	80.25	99.50

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

⁴ Rates expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Hepatitis C, Chronic - Continued

Comparison to National Data. Due to changes in disease definition in Missouri, the rate of reported chronic Hepatitis C has fluctuated widely, preventing any clear delineation of disease trends (**Figure 7B**). Nationally, chronic Hepatitis C did not become a reportable disease until 2003, so comparative statistics are unavailable.

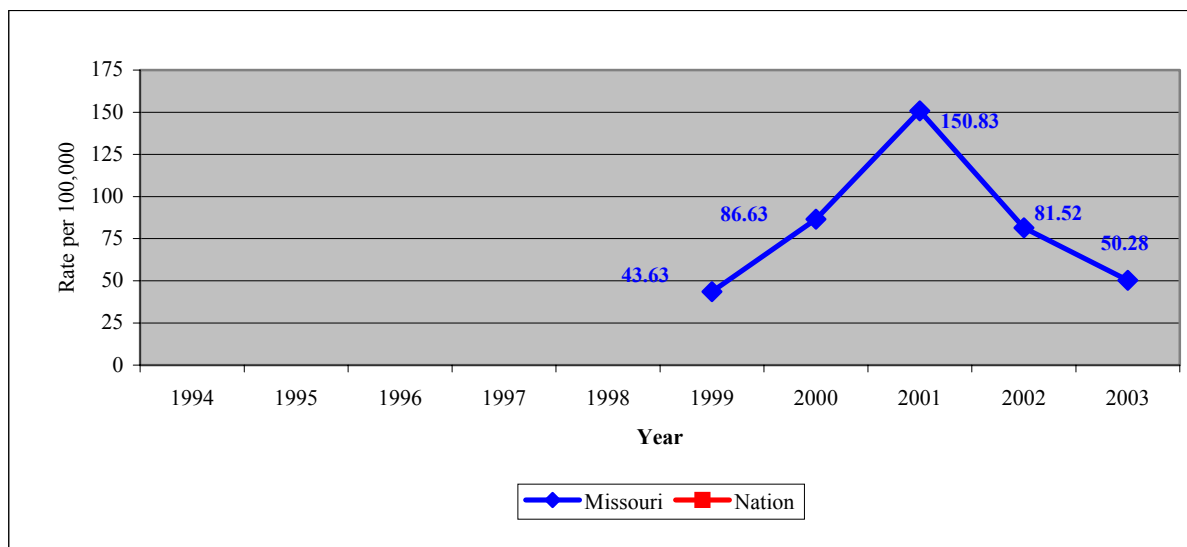


Figure 7B - Hepatitis C (Chronic) Rates of Reported Cases, Missouri , 1999-2003

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Section B - Communicable Disease Surveillance

HIV Disease

Missouri Incidence. In 2003, 647 newly diagnosed HIV Disease cases were reported in Missouri residents. Of these, males represented 79.8% (516 cases). This is consistent with percentages of infected Missourians in the last several years.

For the second time in the last four years, African Americans were reported with a higher number of cases than Whites (**Table 8B**). The 2003 case rate for African Americans was 54.0 per 100,000 in population. This is almost nine times higher than the case rate in Whites (6.1). The case rate in Hispanic persons, 7.6, is a notable difference from the mean rate from the previous five-year period (15.0 cases per 100,000) (**Table 8B**).

Persons aged 20-29 and 30-39 years had case counts reported of 254 and 166, respectively. These age groups account for almost two-thirds of the 2003 cases of HIV Disease (**Table 8B**).

The St. Louis Region (a seven county area including St. Louis City and St. Louis County) and the Kansas City Region (a ten-county area containing all of the Kansas City metropolitan area) reported the majority of the 2003 cases (82.5%). The four remaining regions had case rates near 5 per 100,000 (**Table 8B**).

Additional Missouri Information
[Case Definition](#)
[Fact Sheet](#)
[Health Region Defined](#)

Table 8B - HIV Disease Comparative Statistics, by Socio-demographic Category, Missouri

	2003 Cases	2003 Rate*	5 Year Mean Rate*
Race			
White	285	6.1	6.5
Black	338	54.0	43.4
Hispanic	9	7.6	15.0
Other/ Unknown	15	9.1	4.9
Sex			
Male	516	19.0	17.7
Female	131	4.6	4.2
Age Group			
<13	2	0.2	0.4
13-19	24	4.2	3.2
20-29	166	22.7	20.0
30-39	254	31.0	29.8
40-49	146	17.4	16.0
50+	55	3.4	3.3
Region**			
St. Louis Region	384	19.2	14.9
Kansas City Region	150	13.0	14.4
North Central Region	37	5.2	6.7
Northwest Region	11	4.6	4.6
Southeast Region	19	4.0	5.1
Southwest Region	46	4.6	5.1

* Rates expressed as cases per 100,000 population, based on Census 2000 data
** HIV Regions differ from MDHSS Health Reporting Regions

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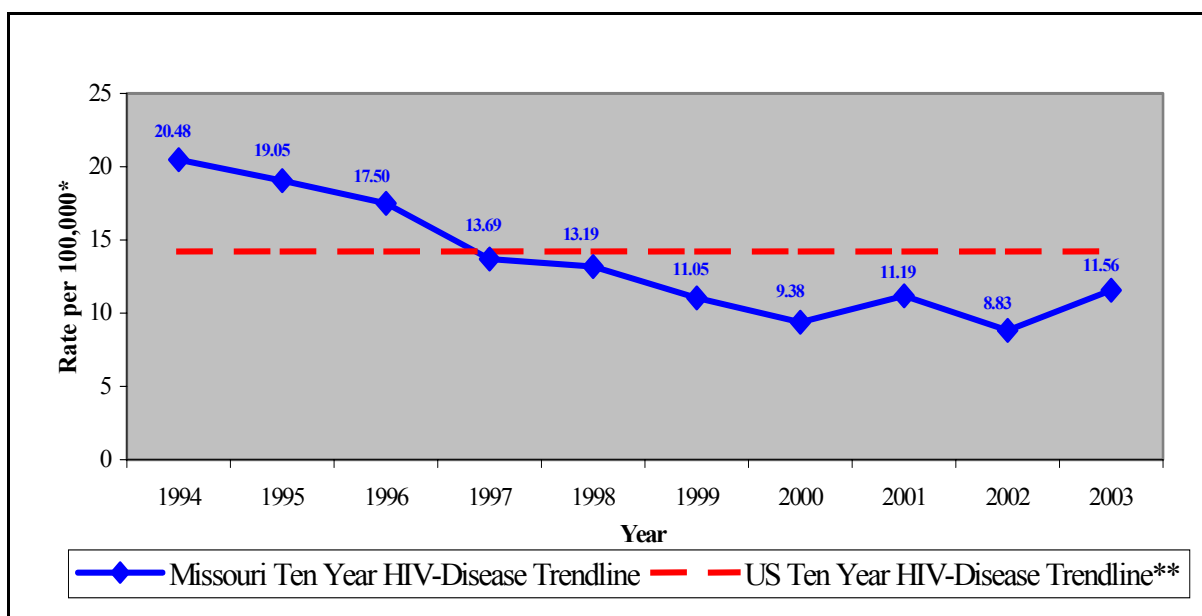
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Section B - Communicable Disease Surveillance

HIV Disease - Continued

Comparison to National Data. Since 1997, Missouri's HIV Disease case rate has been below the CDC national estimated case rate of 14.2 per 100,000 in population. Recent years have shown notable variations in incidence rates (**Figure 8B**). From 1994 through 2000, the rate of infection was consistently decreasing. However, that decreasing trend did not continue after 2000. The rate has fluctuated from 8.83 to 11.56 per 100,000 population during 2000-2003. It should be noted, however, that reporting anomalies might have contributed to these recent fluctuations.



*Population based on Census 2000 counts for Missouri and the United States

**As some states do not require HIV reporting, the CDC estimates 40,000 new HIV infections annually.

Figure 8B - HIV Disease Rates of Reported Cases, Missouri, 1994-2003

Additional Resources/Links:

[CDC's Division of HIV/AIDS Prevention](#)
[CDC's Global AIDS Program](#)
[Kaiser Family Foundation State Health Facts Online](#)
[Kaiser Family Foundation](#)
[HIV/AIDS Statistical Reports](#)

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Section B - Communicable Disease Surveillance

Influenza

The influenza season is defined as the period between Week 40 of one year and Week 20 of the next. For the 2003-2004 season it began on October 4, 2003 and ended on May 22, 2004. There were 17,834 laboratory-confirmed cases of influenza reported in Missouri for the 2003-2004 season. These numbers represent greater than a four-fold increase over last season. Laboratory-confirmed influenza began to increase significantly during week 47, which is unusually early compared to the previous three seasons (**Figure 9B**).

Increased use of the rapid-test method of confirming influenza and additional insurance coverage of the rapid test may have affected reporting this season. Media attention to the pediatric deaths that occurred in some states may have increased the public's awareness about influenza this past season.

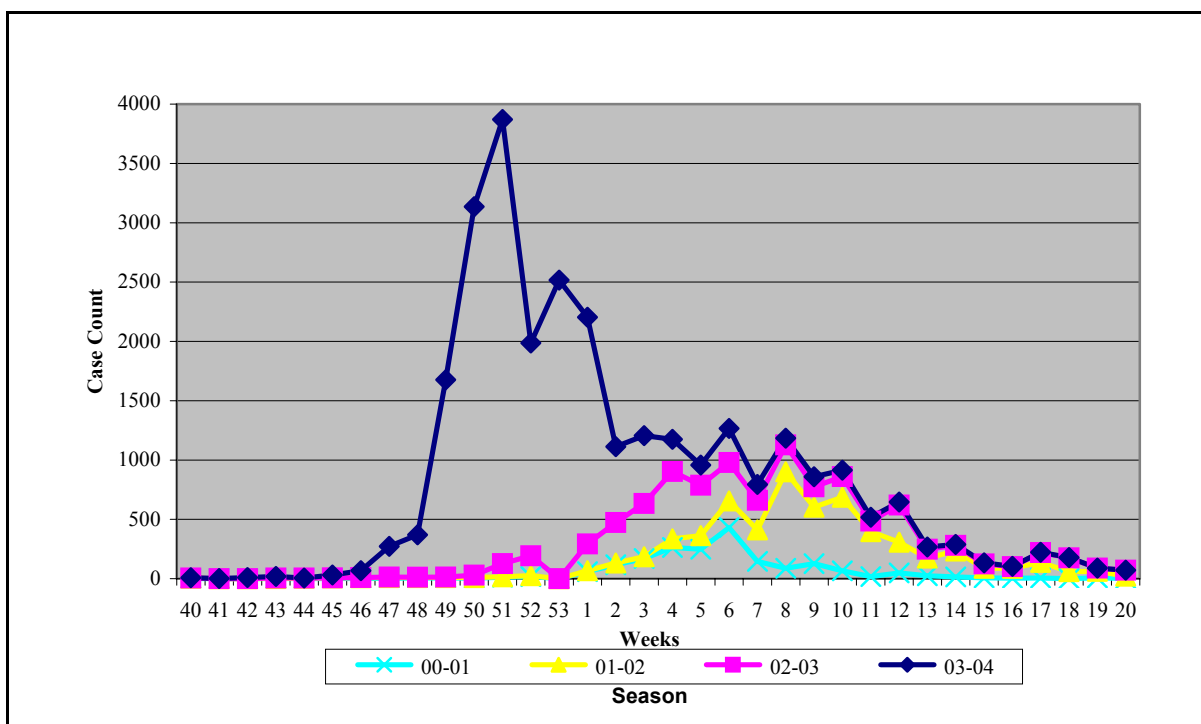


Figure 9B - Laboratory-Confirmed Influenza, Comparison of Seasons 00-01, 01-02, 02-03, 03-04, Missouri

Section B - Communicable Disease Surveillance

Influenza - Continued

Another possible explanation for this increase was the drift in the influenza strain in relation to the vaccine that was available. The A/Fujian strain emerged as the predominant strain this season. It was identified late in January 2003. At that time, it seemed possible that this strain might predominate during the coming flu season, but it was too early to be certain. According to the Centers for Disease Control and Prevention: "U.S. health authorities postponed their recommendation about which A (H3N2) strain should be included in the vaccine for a full month (until March) while more viruses were tested and while attempts were made to grow an egg isolate of the A/Fujian virus that could be used in vaccine production. A suitable isolate could not be grown in time and waiting longer likely would have jeopardized the supply of influenza vaccine for the 2003-04 season. Because of these considerations, in March it was recommended that the influenza vaccine for the 2003-04 influenza season include an A/Panama strain, which is related to the A/Fujian strain."¹ It was also possible that Missouri experienced a more severe influenza season than was previously recorded. Most likely, all of these factors combined to produce the highest number of cases ever reported in a given year (**Figure 10B**). Laboratory-confirmed cases of influenza are not reportable nationwide so national data are unavailable for comparison.

¹Centers for Disease Control and Prevention web site: <http://www.cdc.gov/flu/about/qa/fluseason.htm>

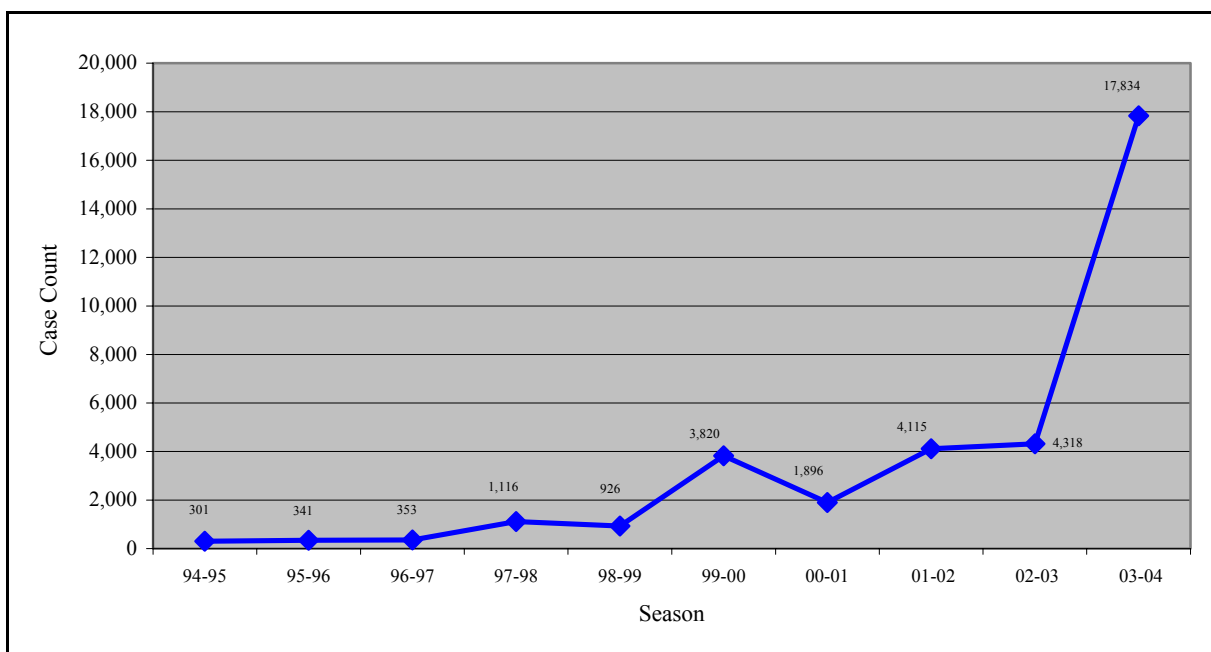


Figure 10B - Influenza Case Count, Missouri Ten-Season Trend Line



Section B - Communicable Disease Surveillance

Influenza - Continued

Although Missouri's totals this season were higher than any year on record, certain characteristics regarding the distribution of the cases have been consistent with previous years. Historically, laboratory-confirmed cases of influenza are evenly distributed among sex, race, or ethnicity subgroups. The 2003-2004 season was no exception. Over the past six seasons (03-04 season included), the Central region reported the highest rate for four of the last six seasons. The Northwest and Southwest regions reported the lowest rate of influenza for three of the last six seasons, respectively (**Table 9B**). Age, however, is a factor in determining susceptibility to influenza. The data continue to show that two groups experienced a greater risk than any other, i.e., those under the age of 13 and those 50 years or above. The 2003-2004 season continued to follow this pattern (**Table 9B**).

Table 9B - Number of Laboratory-Confirmed Influenza Cases, Missouri, 2003-2004 Season and Comparison to Five Season Mean*, by Age and Region

	2003-2004 Season Case Counts	2003-2004 Season Rate**	Two Season Mean Rate (01-02 & 02- 03)**		Three Season Mean Rate (98- 99, 99-00, 00- 01)**
Age Group				Age Group	
<13	10,831	1,065.61	262.7	<10	82.7
13-19	1,480	256.16	84.3	10-19	29.7
20-29	1,188	162.34	28.2	20-29	12.4
30-39	735	89.67	19.9	30-39	7.6
40-49	531	63.22	15.5	40-49	5.9
50+	2,290	365.86	66.4	50+	18.7
Unknown	779	79.19	14.7	Unknown	9.3
			Five Season Mean Rate**		
Region					
Central Region	2,390	384.78	12.9		
Eastern Region	6,785	317.49	9.7		
Northwest Region	4,751	325.59	8.4		
Southeast Region	1,644	357.82	7.0		
Southwest Region	2,245	244.46	4.7		

*Age data was collected in different ranges depending on season

** Per 100,000 population, based on Census 2000 data

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Section B - Communicable Disease Surveillance

Influenza - Continued

Although the 2003-2004 season showed a large increase in reported cases compared to prior seasons, it is difficult to predict if this trend will continue. The many factors listed previously and the constant mutation of the influenza virus make it especially important that those at the greatest risk be vaccinated annually and everyone follow general prevention guidelines as they are conveyed before each new influenza season.

Additional Missouri Information
[Case Definition](#)
[Fact Sheet](#)
[Health Region Defined](#)
[Submitting Specimens to MO SPHL](#)

GENERAL INFORMATION

Regarding symptoms, prevention, vaccine, and other topics:

[Protect Yourself and Loved Ones from Influenza](#)

[CDC-Weekly Influenza Statistics](#)

[World Health Organization Influenza Information](#)



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Section B - Communicable Disease Surveillance

Pertussis

Missouri Incidence. In 2003, there were 208 reported cases of pertussis for a rate of 3.72 per 100,000 population (**Table 10B**). In comparison to combined 1998-2002 data, the rate of pertussis significantly increased by 114% ($p < .001$).

Considering only those cases with reported socio-demographics, there were no apparent racial or sexual differences in the reported rate of pertussis (**Table 10B**).

Among all age groups, individuals younger than 13 years had the highest rate. Among the Health Regions, the Northwest Health Region had the highest rates of pertussis (**Table 10B**). [NOTE: 10% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported pertussis significantly increased among both males ($p < .001$) and females ($p < .001$) and among individuals in all age groups (**Table 10B**).

Additionally, the rate of reported pertussis significantly increased in the Northwest ($p < .001$) and Central ($p < .01$) Health Regions, but decreased in the Southeast Health Region ($p < .05$) (**Table 10B**). [NOTE: Due to missing data, 2003 data were not compared to 1998-2003 for race/ethnicity.]

Additional Missouri Information

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Table 10B - Pertussis Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	208	3.72	1.73
SEX ¹			
Male	92	3.38	1.65
Female	115	4.00	1.81
RACE/ETHNICITY ^{1,3}			
White	162	3.36	0.36
Black	22	3.36	0.49
Hispanic	3	2.53	0.84
AGE GROUP ¹			
<=12 yrs	134	13.18	8.21
13-19 yrs	32	5.54	0.87
20-29 yrs	7	0.96	0.36
30-39 yrs	13	1.59	0.27
40-49 yrs	13	1.55	0.26
50-59 yrs	6	0.96	
60+ yrs	2	0.20	0.00
HEALTH REGION ¹			
Northwest	126	8.63	1.85
Eastern	52	2.43	2.15
Central	16	2.58	1.16
Southeast	3	0.65	2.18
Southwest	11	1.20	0.74

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

⁴ Rates expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Pertussis - Continued

Comparison to National Data. As with the national rate, since 1994, Missouri's annual rate of reported pertussis has consistently increased (**Figure 11B**). However, from 1994-2002 Missouri's rates of reported pertussis were on average 42% lower than the national rates.

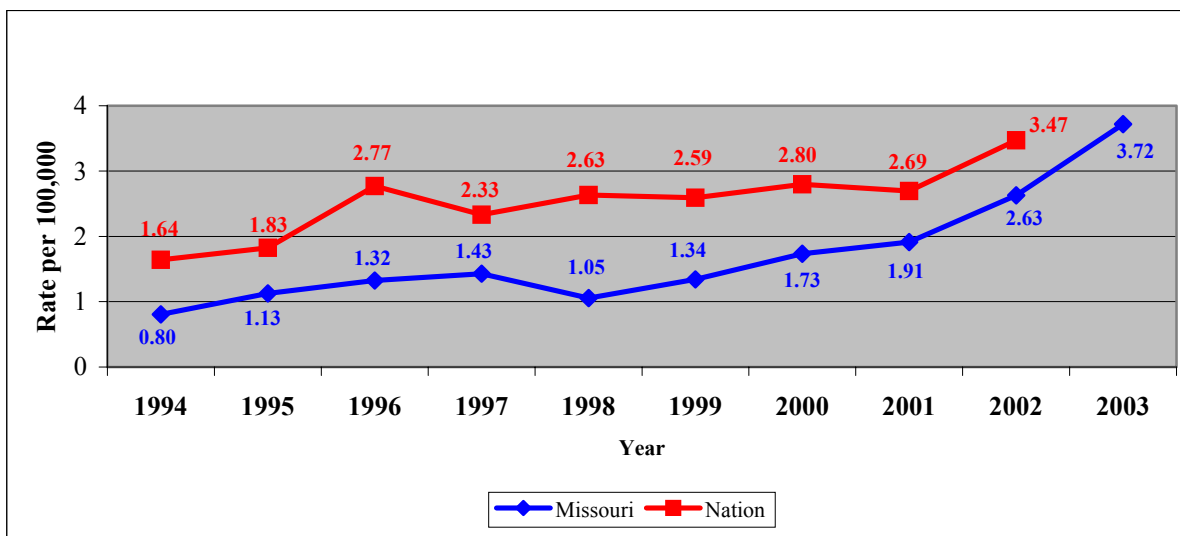


Figure 11B - Pertussis Rates of Reported Cases, Missouri versus United States, 1994-2003

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[National Immunization Program](#)

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Section B - Communicable Disease Surveillance

Salmonellosis

Missouri Incidence. Salmonellosis is one of the most common communicable diseases in Missouri. In 2003, there were 882 reported cases of salmonellosis for a rate of 15.76 per 100,000 population (**Table 11B**). In comparison to combined 1998-2002 data, the rate of salmonellosis significantly increased by 23% ($p < .001$).

Considering only those cases with reported socio-demographics, the 2003 rates of reported salmonellosis were similar for males and females (**Table 11B**).

African Americans had a significantly higher rate of salmonellosis than did Whites ($p < .01$). Individuals aged less than 13 years and the Southeast Health Region had the highest rates of salmonellosis for their respective socio-demographic (**Table 11B**). [NOTE: 53% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported salmonellosis significantly increased among both males ($p < .01$) and females ($p < .001$) and among individuals in all age groups above 20 years (**Table 11B**).

Additionally, the rate of reported salmonellosis significantly increased in the Northwest ($p < .001$) and Eastern ($p < .001$) Health Regions (**Table 11B**). [NOTE: Due to missing data, 2003 data were not compared to 1998-2003 for race/ethnicity.]

Table 11B - Salmonellosis Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	882	15.76	12.80
SEX ¹			
Male	398	14.63	12.60
Female	478	16.63	12.81
RACE/ETHNICITY ^{1,3}			
White	336	6.97	0.28
Black	70	10.68	0.24
Hispanic	9	7.59	0.00
AGE GROUP ¹			
<=12 yrs	304	29.91	26.76
13-19 yrs	45	7.79	8.58
20-29 yrs	108	14.76	10.77
30-39 yrs	106	12.93	9.35
40-49 yrs	111	13.22	8.88
50-59 yrs	86	13.74	8.18
60+ yrs	111	11.28	8.64
HEALTH REGION ¹			
Northwest	217	14.87	9.85
Eastern	383	17.92	13.74
Central	75	12.07	12.85
Southeast	98	21.33	18.72
Southwest	97	10.56	11.74

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

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Section B - Communicable Disease Surveillance

Salmonellosis - Continued

Comparison to National Data. Since 1994, Missouri's annual rate of reported salmonellosis has generally increased (**Figure 12B**). From 1994-2002 Missouri's rates of reported salmonellosis were on average 22% lower than the national rates.

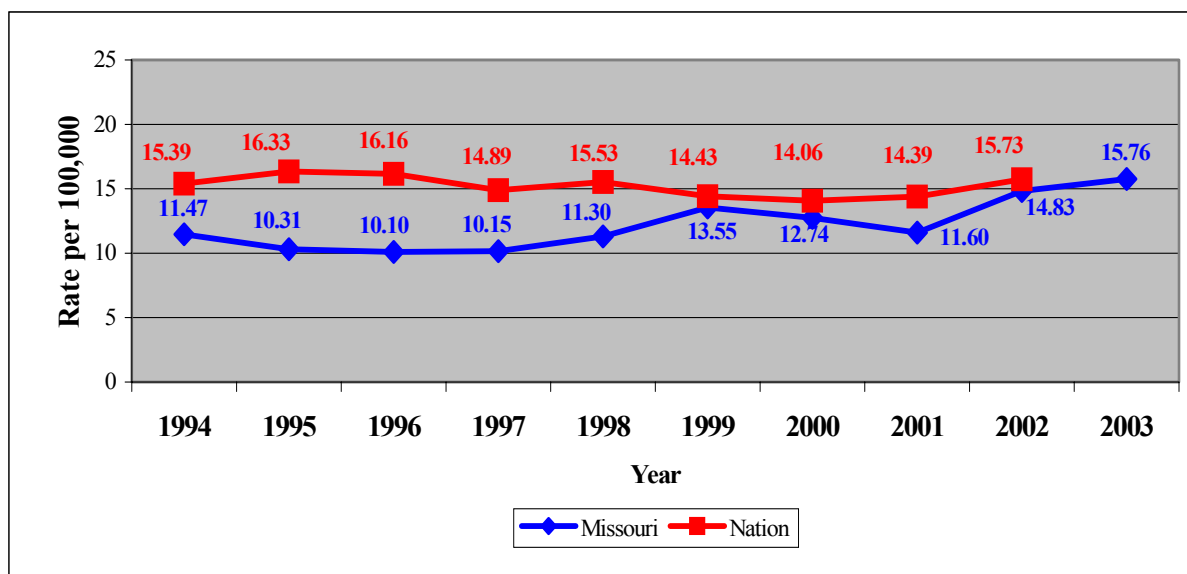


Figure 12B - Salmonellosis Rates of Reported Cases, Missouri versus United States, 1994-2003

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Section B - Communicable Disease Surveillance

Shigellosis

Missouri Incidence. In 2003, there were 356 reported cases of shigellosis for a rate of 6.36 per 100,000 population (**Table 12B**). In comparison to combined 1998-2002 data, the rate of shigellosis significantly decreased by 17% ($p<.01$).

Considering only those cases with reported socio-demographics, the 2003 rates of reported shigellosis were similar for males and females (**Table 12B**).

African Americans ($p<.001$) and Hispanics/Latinos ($p<.01$) had significantly higher rates of acute shigellosis than did Whites. Individuals aged less than 13 years and the Eastern Health Region had the highest rates of shigellosis for their respective socio-demographic (**Table 12B**). [NOTE: 42% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported shigellosis significantly decreased among females ($p<.01$) and among individuals aged less than 13 ($p<.05$), 30-39 ($p<.05$), and 40-49 ($p<.01$) (**Table 12B**).

Additionally, the rate of reported shigellosis significantly decreased in the Northwest Health Region ($p<.001$), but increased in the Central Health Region ($p<.05$) (**Table 12B**). [NOTE: Due to missing data, 2003 data were not compared to 1998-2003 for race/ethnicity.]

Table 12B - Shigellosis Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	356	6.36	7.69
SEX ¹			
Male	166	6.10	6.84
Female	186	6.47	8.29
RACE/ETHNICITY ^{1,3}			
White	105	2.18	0.29
Black	94	14.34	1.25
Hispanic	7	5.90	0.34
AGE GROUP ¹			
<=12 yrs	223	21.94	25.38
13-19 yrs	23	3.98	2.98
20-29 yrs	45	6.15	6.26
30-39 yrs	27	3.29	4.95
40-49 yrs	10	1.19	2.74
50-59 yrs	14	2.24	2.08
60+ yrs	8	0.81	1.38
HEALTH REGION ¹			
Northwest	28	1.92	6.59
Eastern	226	10.58	11.07
Central	37	5.96	3.83
Southeast	23	5.01	3.48
Southwest	41	4.46	6.16

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

⁴ Rates expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Shigellosis - Continued

Comparison to National Data. Missouri's annual rate of reported shigellosis has fluctuated, between 3.88 and 20.34 cases per 100,000 population during 1994 to 2003 (**Figure 13B**). Overall, Missouri's rates of reported shigellosis are similar to the national rates.

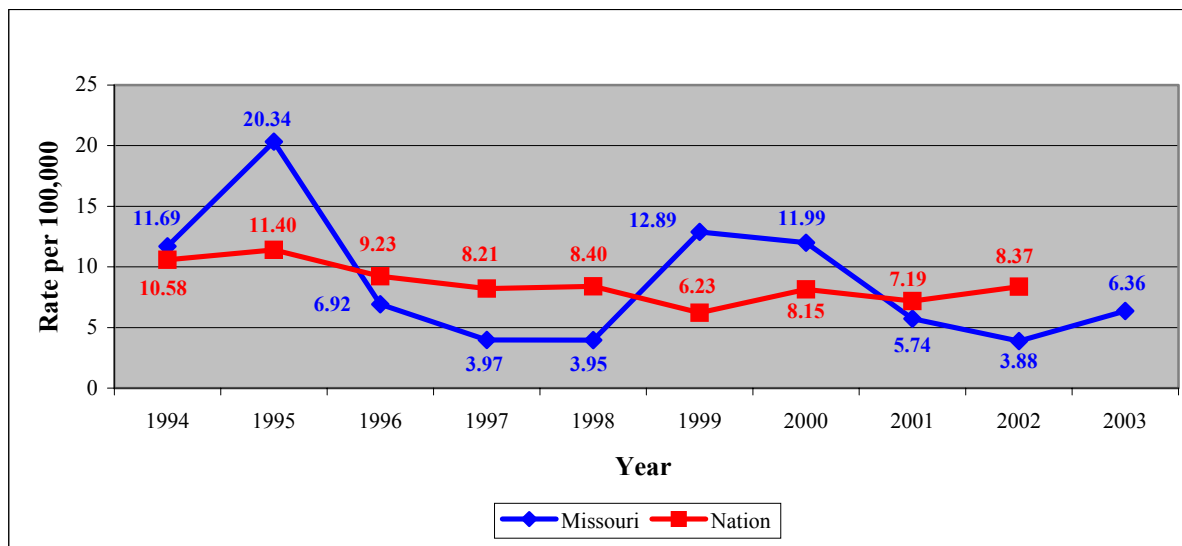


Figure 13B - Shigellosis Rates of Reported Cases, Missouri versus United States, 1994-2003

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Section B - Communicable Disease Surveillance

Streptococcal Disease, Invasive, Group A (GAS)

Missouri Incidence. In 2003, there were 81 reported cases of GAS in Missouri residents for a rate of 1.45 per 100,000 population (**Table 13B**). In comparison to combined 1998-2002 data, the rate of reported GAS significantly increased by 64% ($p<.001$).

Considering only those cases with reported socio-demographics, the 2003 rates of reported GAS were similar between the sexes, the various race/ethnicity groups, and the health regions (**Table 13B**).

Individuals aged 50-59 and 60+ years had higher rates of GAS than did the other age groups (**Table 13B**). [NOTE: 27% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported GAS significantly increased among females ($p<.001$) and individuals aged 50-59 ($p<.01$) and 60+ ($p<.01$) (**Table 13B**).

Additionally, the rate of reported GAS significantly increased in the Eastern ($p<.001$) and Southwest ($p<.001$) Health Regions (**Table 13B**). [NOTE: Due to missing data, 2003 data were not compared to 1998-2003 for race/ethnicity.]

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Table 13B - GAS Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	81	1.45	0.88
SEX ¹			
Male	31	1.14	0.98
Female	50	1.74	0.79
RACE/ETHNICITY ^{1,3}			
White	51	1.06	0.05
Black	7	1.07	0.06
Hispanic	1	0.84	0.17
AGE GROUP ¹			
<=12 yrs	8	0.79	0.77
13-19 yrs	1	0.17	0.17
20-29 yrs	5	0.68	0.49
30-39 yrs	9	1.10	0.68
40-49 yrs	9	1.07	0.67
50-59 yrs	16	2.56	0.99
60+ yrs	33	3.35	1.83
HEALTH REGION ¹			
Northwest	20	1.37	1.41
Eastern	36	1.68	0.84
Central	7	1.13	0.58
Southeast	1	0.22	0.22
Southwest	17	1.85	0.65

¹ Socio-demographic data are missing for some cases.

² All rates calculated using 2000 U.S. Census Bureau data.

³ Race/ethnicity categories are not mutually exclusive.

⁴ Rates expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Streptococcal Disease, Invasive, Group A (GAS) - Continued

Comparison to National Data. With the exception of 2002, the annual rate of reported GAS has increased markedly since 1994 (**Figure 14B**). From 1999-2001, Missouri's rates of reported GAS were almost identical to the national rates. In 2002, the national rate exceeded Missouri's rate.

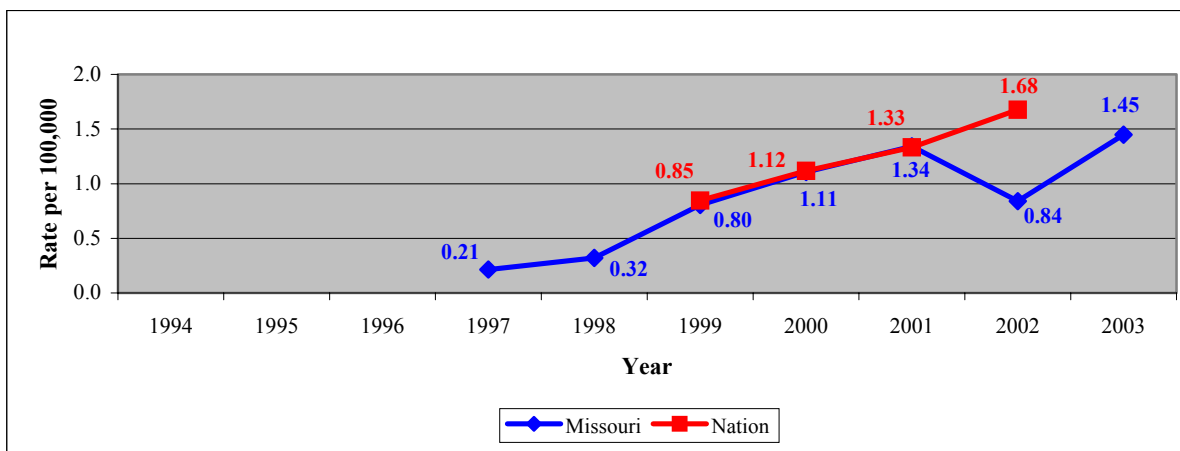


Figure 14B - GAS Rates of Reported Cases, Missouri versus United States, 1997-2003

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Section B - Communicable Disease Surveillance

Syphilis, Primary & Secondary

Missouri Incidence. In 2003, 61 cases of Primary & Secondary Syphilis were reported in Missouri residents. Of these cases, 47 (77%) were in males.

In 2003, as well as in each of the subsequent five years, African Americans had a higher rate than other races. The 2003 case rate in African Americans was 4.6 per 100,000 population, which is nine times that of Whites (0.5). It should be noted that race was not indicated in 6 (10%) cases during 2003 and, if race were to be determined in these cases, the resulting redistribution would be similar (**Table 14B**).

Of all age groups, the highest case rate was found in the 40 - 44 group, at 2.7 per 100,000, which is higher than their corresponding five-year mean rates. Persons aged 30-54 years had 42 (68.8%) reported cases in 2003, whereas in the previous five years, persons in the 30-54 age groups accounted for an average of 52.6% of the reported cases. This indicates that infection among older individuals may be rising (**Table 14B**).

Table 14B - Syphilis (Primary and Secondary) Comparative Statistics, by Socio-demographic Category, Missouri

	2003 Case Count	2003 Case Rate ^{1,2}	5 year Mean Rate ¹
Race			
American Indian/Eskimo			
Asian/Pacific Islander			
Black	29	4.6	7.0
White	26	0.5	0.2
Other			
Unknown	6	7.3	3.9
Sex			
Male	47	1.7	1.2
Female	14	0.5	0.9
Age Group			
<10			0.0
10 - 14			0.1
15 - 19	1	0.2	1.8
20 - 24	7	1.9	3.1
25 - 29	6	1.7	2.0
30 - 34	9	2.4	1.6
35 - 39	5	1.1	2.6
40 - 44	12	2.7	1.3
45 - 54	16	2.2	0.9
55 - 64	4	0.8	0.2
65 +	1	0.1	0.1
Unknown			
Health Region³			
City of St. Louis	18	5.2	8.5
St. Louis County	18	1.8	1.0
Kansas City	17	3.9	1.3
Outstate	8	0.2	0.3
Missouri	61	1.1	1.1

¹ All rates expressed as cases per 100,000 population

² Bold print numerals indicate rates that have exceeded the 5-year mean rate

³ Outstate includes all areas except St. Louis County, St. Louis City and Kansas City

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Section B - Communicable Disease Surveillance

Syphilis, Primary & Secondary - Continued

Geographically, St. Louis City reported 18 cases in 2003 with an associated case rate of 8.5 per 100,000 residents. In 2002, St. Louis City ranked 29th in Primary & Secondary case rates (3.7) in the nation within cities with more than 200,000 residents. Kansas

City ranked 43rd in the same study with a rate of 1.8 per 100,000 residents. Moreover, the 2003 case rates for both St. Louis and Kansas City are higher than their 2002 respective rates. The case rate in 2003 for St. Louis was lower than its corresponding five-year mean rate, whereas the Kansas City case rate was higher than the 5-year mean rate (**Table 14B on Page 41**).

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Comparison to National Data. Comparing Missouri's case rates with the national average rates, Missouri's rate has been lower than the national average from 1996 to 2002. Prior to 1996, Missouri's rate was higher than the national rate. There was also an outbreak of syphilis in Missouri in 1995. At the time of publication, the national case rate was not available for 2003, so a rate comparison between Missouri and the nation could not be presented for that year (**Figure 15B**).

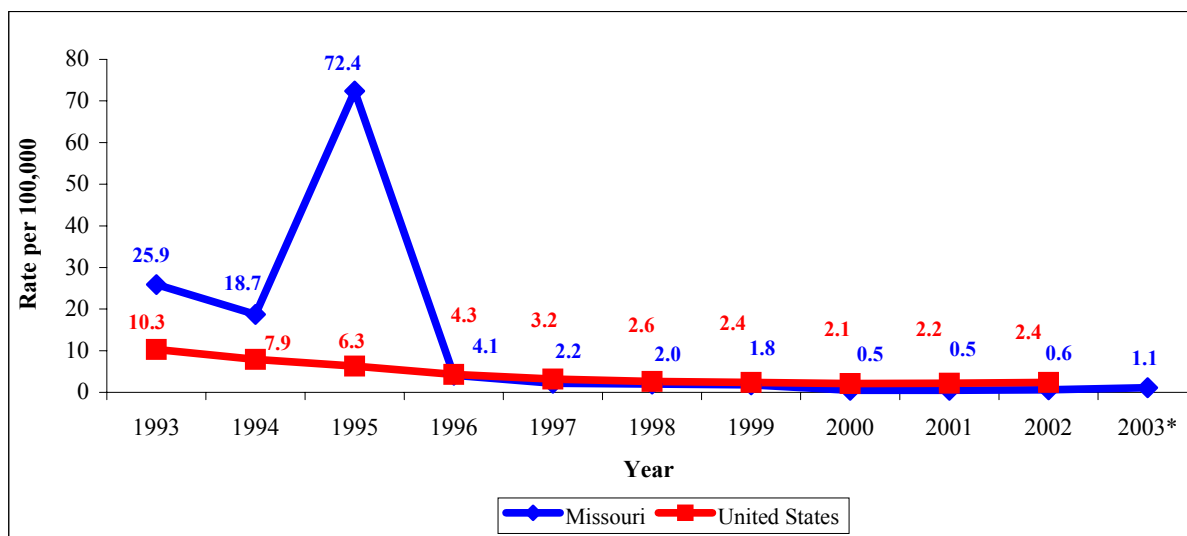


Figure 15B - Primary and Secondary Syphilis Rates of Reported Cases, Missouri Versus United States, 1993-2003

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Section B - Communicable Disease Surveillance

Tuberculosis Disease

Missouri Incidence. In 2003, there were 131 reported cases of confirmed tuberculosis disease in Missouri residents for a rate of 2.34 per 100,000 population (**Table 15B**). In comparison to combined 1998-2002 data, the rate of tuberculosis disease significantly decreased by 27% ($p < .001$).

Considering only those cases with reported socio-demographics, the 2003 rate of reported tuberculosis disease was significantly higher for males than females ($p < .001$) (**Table 15B**).

African Americans ($p < .001$) and Hispanics/Latinos ($p < .001$) had significantly higher rates of tuberculosis disease than did Whites. Individuals aged 60+ years and the Southwest Health Region had the highest rates of tuberculosis disease for their respective socio-demographic (**Table 15B**). [NOTE: Only 4% of cases did not have a race/ethnicity designation.]

In comparison to combined 1998-2002 data, the 2003 rate of reported tuberculosis disease significantly decreased among males ($p < .05$) and females ($p < .01$), African Americans ($p < .05$), and individuals aged 30-39 years ($p < .05$) (**Table 15B**). Additionally, the rate of reported tuberculosis disease significantly decreased in the Eastern ($p < .001$) and Central ($p < .05$) Health Regions.

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Table 15B - Tuberculosis Disease Comparative Statistics, by Socio-demographic Category¹, Missouri

	2003 Case Count	2003 Rate ^{2,4}	Mean Rate: 1998-2002 ^{2,4}
Total	131	2.34	3.20
SEX ¹			
Male	90	3.31	4.16
Female	41	1.43	2.28
RACE/ETHNICITY ^{1,3}			
White	74	1.54	1.70
Black	40	6.10	11.50
Hispanic	12	10.12	8.60
AGE GROUP ¹			
<=12 yrs	7	0.69	0.94
13-19 yrs	4	0.69	0.66
20-29 yrs	13	1.78	2.41
30-39 yrs	16	1.95	3.64
40-49 yrs	22	2.62	3.41
50-59 yrs	21	3.36	4.06
60+ yrs	48	4.88	6.51
HEALTH REGION ¹			
Northwest	41	2.81	3.29
Eastern	50	2.34	3.71
Central	4	0.64	1.90
Southeast	9	1.96	3.40
Southwest	27	2.94	2.79

¹ Socio-demographic data are missing for some cases.
² All rates calculated using 2000 U.S. Census Bureau data.
³ Race/ethnicity categories are not mutually exclusive.
⁴ Rates expressed as cases per 100,000 population.

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Section B - Communicable Disease Surveillance

Tuberculosis Disease - Continued

Comparison to National Data. Since 1994, Missouri's annual rate of reported tuberculosis disease has generally decreased (**Figure 16B**). From 1994-2002, Missouri's rates of reported tuberculosis disease were on average 45% lower than the national rates.

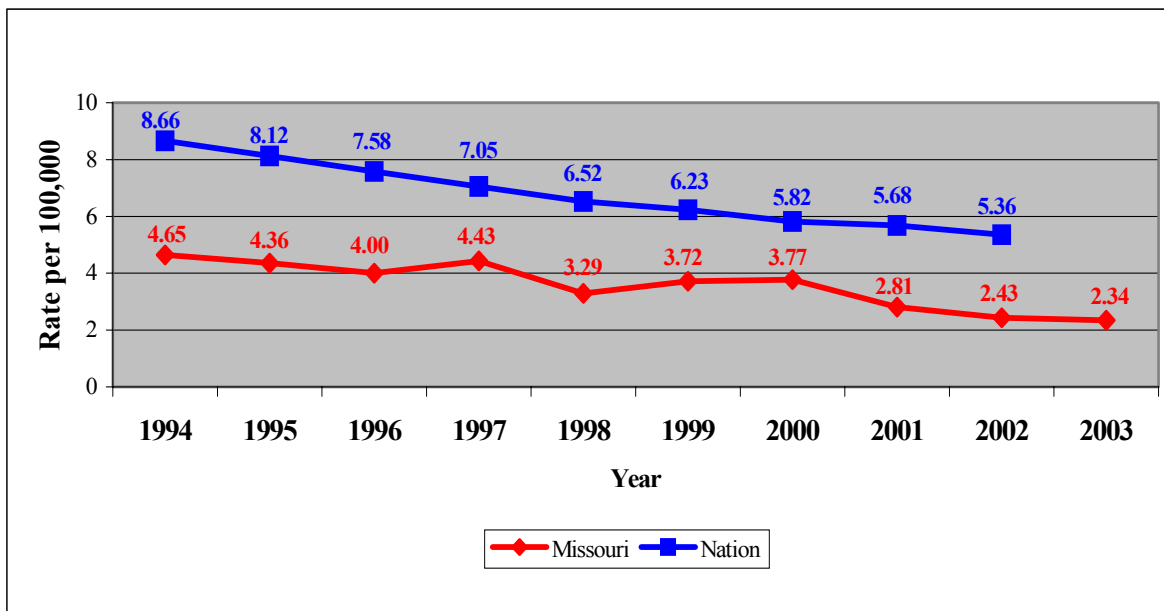


Figure 16B - Tuberculosis Disease Rates of Reported Cases, Missouri versus United States, 1994-2003

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Section C - Environmental Surveillance

Environmental and occupational diseases and conditions have been reportable in Missouri since legislation mandating such reporting was enacted in 1993. The reporting of environmental and occupational diseases is a growing component of the overall surveillance effort of the Office of Surveillance (OoS). The OoS is responsible for conducting surveillance, analysis, and generating reports on 12 different categories of environmental and occupationally-induced diseases and conditions. To date, due to several sets of circumstances, the majority of environmental and occupational diseases and conditions are not reported as thoroughly as is needed to accurately track, develop reports, and make predictions on environmental conditions. The major cause of under reporting appears to be the lack of knowledge by mandated reporters of these 12 categories of environmental and occupationally induced diseases and conditions: Hyperthermia, Hypothermia, Blood lead levels in any person ≤ 72 months of age, Blood lead levels in any person ≥ 72 months of age, Ricin, Arsenic poisoning, Carbon monoxide poisoning, Chemical poisoning, Heavy metal poisoning, Occupational lung diseases, Pesticide poisoning, Respiratory diseases triggered by environmental contaminants including environmentally or occupational induced asthma, and bronchitis.

There is adequate information and data in the categories of Adult Blood Lead levels, Childhood Blood Lead levels, Hazardous Substances Emergency Events, Carbon Monoxide Poisoning, Hyperthermia and Hypothermia to accurately analyze and generate reports. Reports on these diseases and conditions are provided on the subsequent pages.



Section C - Environmental Surveillance

Missouri Adult Lead Surveillance and Epidemiology Program

The Centers for Disease Control and Prevention (CDC), National Institute of Occupational Safety and Health (NIOSH) has funded states to operate the Adult Blood Lead Epidemiology and Surveillance (ABLES) program since 1987. The goal of this program is the elimination of all cases of workplace-induced blood lead elevations ≥ 25 $\mu\text{g/dL}$ (micrograms of lead per deciliter of blood) in adults by the year 2010. In 2003, 32 states were funded to collect and analyze data on cases of elevated blood lead levels in individuals age 16 years and older. The majority of lead elevations in this population are believed to be due to exposures in the workplace. Non-identifying data are reported to NIOSH by the MO ABLES program for national surveillance purposes.

All blood lead testing of Missouri residents is reportable to the Missouri Department of Health and Senior Services (DHSS) under the Missouri Code of State Regulations 19 CSR 20-20.20 and 19 CSR 20-20.80, regardless of age of the patient or blood lead level. DHSS's Office of Surveillance administers the Missouri ABLES (MO ABLES) program, which was first funded by NIOSH in Fall 2001. This report summarizes blood lead testing and elevated lead levels in Missouri residents age 16 years and older for calendar year 2003.

There were 15,195 blood specimens drawn, analyzed, and reported to the MO ABLES program for Missouri residents age 16 years and older for the period January 1 through December 31, 2003. Blood specimens drawn but not analyzed are excluded. The range of reported blood lead levels was from zero (or non-detectable) to a high of 160 $\mu\text{g/dL}$. The majority of specimens analyzed, 12,447 (81.9%), were <25 $\mu\text{g/dL}$.

Analysis of the MO ABLES 2003 data revealed 2,321 adults were tested more than once, for a total of 9,206 unduplicated individuals being tested in 2003. Of these, 8,274 (89.9%) had lead levels <25 $\mu\text{g/dL}$. There were 766 (8.3%) reported with lead levels between 25 $\mu\text{g/dL}$ and 39 $\mu\text{g/dL}$, and 166 (1.8%) whose highest level was 40 $\mu\text{g/dL}$ or above (**Figure 1C**). For statistical purposes, blood lead level determination for Missourians tested more than once during the timeframe is based upon their highest reported blood lead level.

In total during 2003, 932 (10.1%) of all individuals tested had at least one blood lead test at or above 25 $\mu\text{g/dL}$, the lead level of concern for non-pregnant adults. The highest level acceptable for workers by U.S. Occupational Safety and Health Administration (OSHA) standards is 40 $\mu\text{g/dL}$.

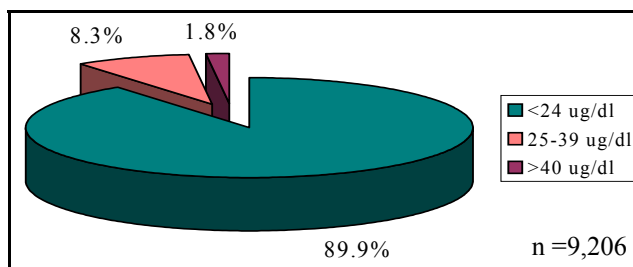


Figure 1C - Missouri Adults by Blood Lead Level, 2003.

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Section C - Environmental Surveillance

Missouri Adult Lead Surveillance and Epidemiology Program (continued)

The MO ABLES program data are primarily collected through reporting by laboratories analyzing blood lead specimens. Information reported is to include patient date of birth or age, home address, gender, race, ethnicity, date of blood lead test, and laboratory results. However, laboratory data often do not include all information needed by the MO ABLES program. Missing information on individuals with blood lead levels ≥ 25 $\mu\text{g/dL}$ is sought by contacting medical providers and employers; therefore, data on non-elevated adults are more likely to be incomplete in the MO ABLES database.

The following data analyses were performed on the data set consisting of only the 932 individuals with at least one blood lead level ≥ 25 $\mu\text{g/dL}$ during calendar year 2003.

Of the 932 elevated adults tested in 2003, the MO ABLES program had date of birth or age information for 782 (83.9%). Of individuals with a known age, 775 (99.1%) were between 18 and 64 years of age at the time their blood specimen was drawn. During this time frame, 7 (0.8%) adults 65 years or older but no 16 or 17 year-olds had an elevated blood lead level. Age was not known for 150 (16.1%) individuals with lead levels ≥ 25 $\mu\text{g/dL}$ (**Figure 2C**). Date of birth and/or age on incomplete records will continue to be sought and added to the database when received.

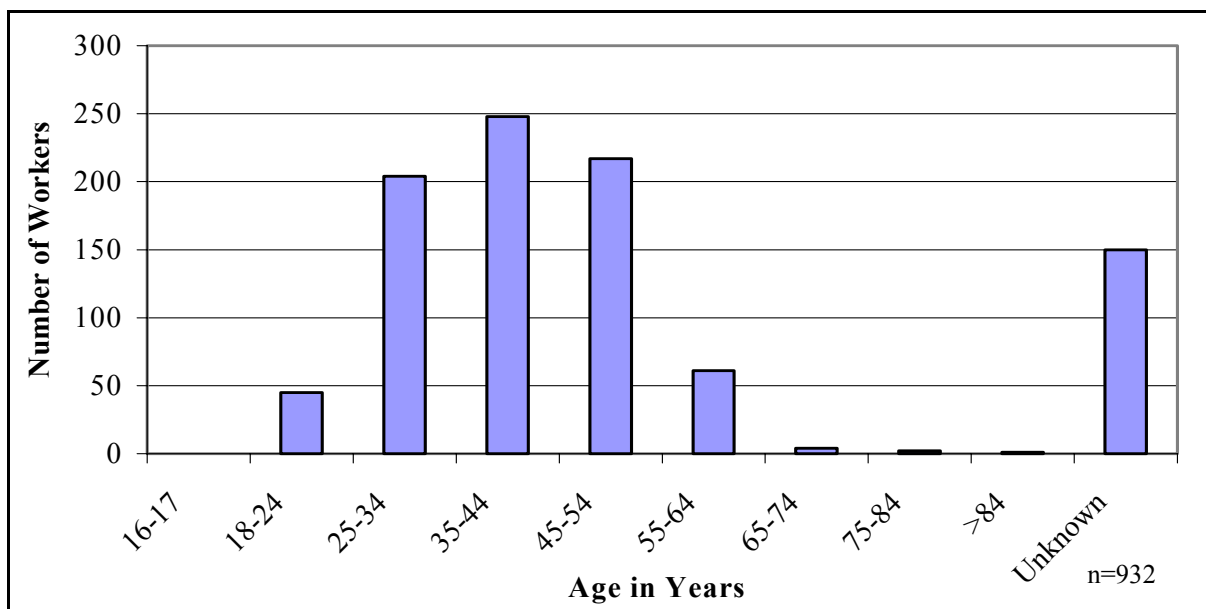


Figure 2C - Adults with Elevated Lead Levels by Age, 2003

Section C - Environmental Surveillance

Missouri Adult Lead Surveillance and Epidemiology Program (continued)

Figure 3C illustrates that 865 (92.8%) adults with elevated lead levels were male, 62 (6.7%) were females, and 5 (0.5%) were unknown gender.

Race and ethnicity information is sought for all adults with elevated lead levels. MO ABLES staff find that many medical providers and employers do not have this information available about their patients and employees. For the 371 individuals with a reported race, 357 (96.2%) were White, 11 (3.0%) were Black, and 3 (0.8%) were Native American or Alaskan Native. None were reported as Asian or Pacific Islander. Of 367 elevated adults with a reported ethnicity, 361 (98.4%) were Non-Hispanic and 6 (1.6%) were Hispanic. However, as indicated in **Figures 4C and 5C**, race and ethnicity are not known for the majority of adults with elevated lead levels.

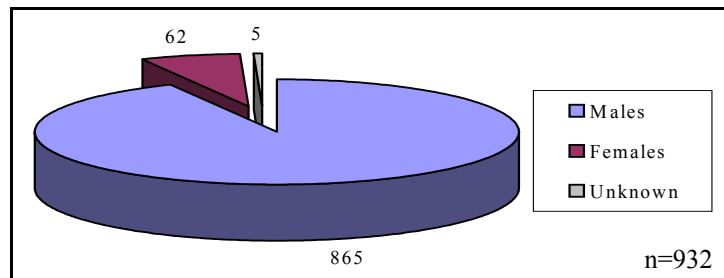


Figure 3C - Adults with Elevated Lead Levels by Gender, 2003

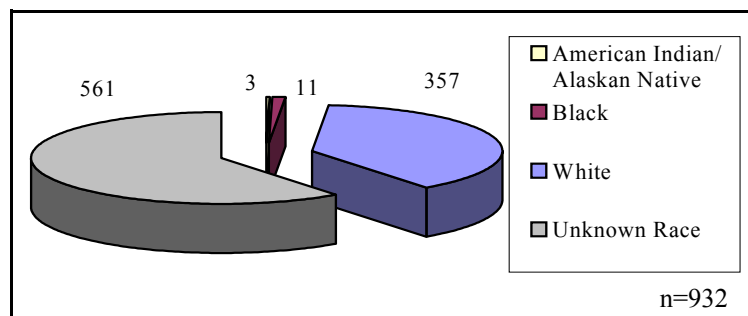


Figure 4C - Adults with Elevated Lead Levels by Race, 2003

Of the 932 individual records with blood lead levels ≥ 25 $\mu\text{g/dL}$ drawn in 2003, 880 (94.4%) have a known employer and Standardized Industry Code (SIC). Eight industries represented 827 (94.0%) of the workers whose records had a SIC code. The industries with the largest numbers of lead-elevated employees are shown in **Figure 6C** and **Table 1C**. A worker's place of employment is assumed to be their source of exposure unless other source of information, such as an exposure by hobby, is received.

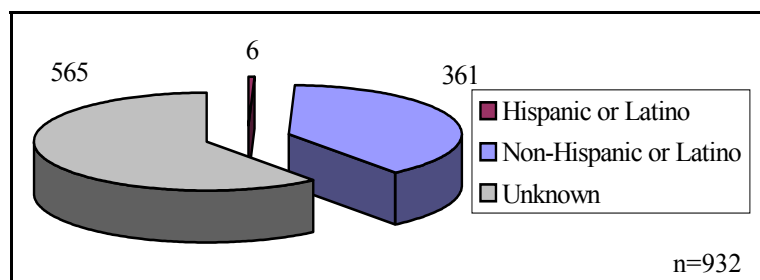


Figure 5C - Adults with Elevated Lead Levels by Ethnicity, 2003

Section C - Environmental Surveillance

Missouri Adult Lead Surveillance and Epidemiology Program (continued)

Lead battery manufacturing, mining, smelting, and other related industries are an important part of Missouri's economic base. Some of the world's largest known lead deposits are located in Missouri, and mining has been ongoing since the 1700s. While lead is a great economic resource, lead in the human body is a health hazard. Missouri's largest lead industries provide community education and services, and they test their employees according to OSHA requirements. These companies also cooperate in providing demographic information to aid the MO ABLES program in data collection.

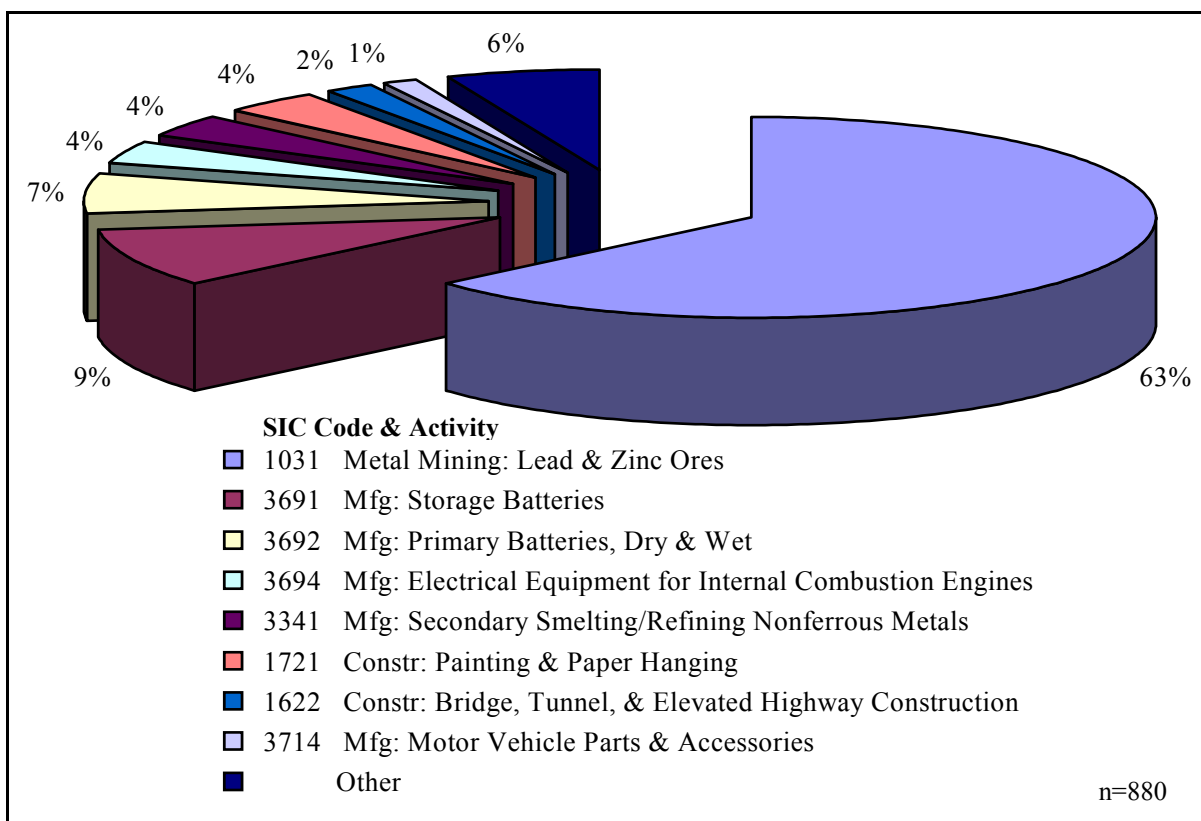


Figure 6C - Industries with Lead-Elevated Workers, 2003



Section C - Environmental Surveillance

Missouri Adult Lead Surveillance and Epidemiology Program (continued)

Table 1C - Lead-Elevated Workers by Industry, 2003

SIC Division	Standard Industry Code (SIC)	SIC Activity	# Workers Elevated >25 µg/c
Metal Mining	1031	Lead & Zinc Ores	561
Manufacturing	3691	Storage Batteries	81
Manufacturing	3692	Primary Batteries, Dry & Wet	58
Manufacturing	3694	Electrical Equipment for Internal Combustion Engines	32
Manufacturing	3341	Secondary Smelting & Refining of Nonferrous Metals	31
Construction	1721	Painting & Paper Hanging	35
Construction	1622	Bridge, Tunnel, & Elevated Highway Construction	17
Manufacturing	3714	Motor Vehicle Parts & Accessories	12
Various	Various	All other Standard Industry Codes combined	53
Total			880



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Section C - Environmental Surveillance

Missouri Adult Lead Surveillance and Epidemiology Program (continued)

There were 23 records for elevated adults without an identifiable employer or SIC code, but for whom an occupation or other source was known. These sources included repairing radiators (2), non-specific construction/demolition (2), painting (3), using firearms (9) and removing lead-based paint (7). The two Missourians with the highest blood lead levels in 2003, 109 µg/dL and 160 µg/dL, were workers sandblasting lead-based paint in an enclosed area. Employment or source information on 29 individuals was not available, including four suspected false positive or mis-reported lead levels, and three persons for whom their physician could not determine the cause of the lead elevation.

The MO ABLES database includes 772 (82.8%) records with a known county of employment for the 932 individuals with a blood lead elevation in calendar year 2003. Workers who are employed out of state are included in the MO ABLES data if they are known to reside in Missouri. Of the 772 lead-elevated workers with a known address of employment, 80 (10.4%) individuals were working in another state. There were 67 (8.7%) Missouri residents with elevated blood lead levels who were employed in Kansas, 7 (0.9%) in Iowa, 2 (0.3%) each in Illinois and Oklahoma, and 1 (0.1%) each in Alabama and Wisconsin ([Map 1](#)).

As shown by [Map 2](#), many workers commute across county boundaries to reach their places of employment. Analysis of this trend is impaired because reported information often does not include a worker's home address to compare with employment address data. Of the 772 workers with elevated blood lead levels for 2003 with a known county of employment, 666 (86.3%) included a county of residence. While workers with known lead elevations live in 57 of Missouri's 115 counties, their places of employment are concentrated in only 24 counties, 7 of which are out-of-state. Of the 932 workers with elevated blood lead levels in 2003, 575 (61.7%) are both employed and live in the state of Missouri.

Rates of adult blood lead elevations were calculated using MO ABLES data and Office of Social and Economic Data Analysis (OSED) employment status data. Dent County had the highest rate with over 3,028 elevations per 100,000 workers. Holt and Iron counties had the next highest rates of elevations 1,180.2 and 784.4 respectively ([Table 2C](#)).



Section C - Environmental Surveillance

Missouri Adult Lead Surveillance and Epidemiology Program (continued)

Table 2C - Number and Rate of Workers with Blood Lead Elevations by County of Employment, Missouri 2003

<i>County of Employment</i>	<i>Number of Workers Elevated ≥ 25 $\mu\text{g/dL}$</i>	<i>Rate of Elevated Workers per</i>
Dent	199	3028.5
Holt	30	1180.2
Iron	35	784.4
Jefferson	216	206.5
Johnson	44	189.3
Clinton	17	178.7
Lafayette	26	156.6
Buchanan	65	156.6
New Madrid	10	115.5
Nodaway	8	68.1
Cole	4	10.7
Henry	1	9.6
Cape Girardeau	3	8.2
St. Louis City	7	4.3
St. Louis	18	3.4
Jackson	8	2.4
Clay	1	1.0
Total	692	

Additional Information

[Centers for Disease Control
Lead Web Site](#)

[Medline Plus - Lead Poisoning](#)

There were 17 Missouri counties (including St. Louis City) where workers with a blood lead elevation ≥ 25 mg/dl were employed in 2003 ([Map 3](#)). Metal mining (SIC 1031), which is the industry employing 561 lead-elevated workers in 2003 (**Table 1C**), is conducted in Dent, Iron and Jefferson counties. Jefferson County also had workers with lead elevations employed in the painting and paper hanging industry (SIC 1721). Secondary smelting and refining of Nonferrous Metals (SIC 3341) occurs in Holt County, where there were 30 workers with lead elevations.

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Section C - Environmental Surveillance

Missouri Childhood Lead

Childhood lead poisoning is one of the most common and preventable environmental health problems today. An estimated one million children in the United States have elevated blood lead levels of at least 10 µg/dL (micrograms per deciliter), which is the level of concern established by the CDC (Centers for Disease Control and Prevention). Lead affects almost every organ and system in the body, most notably the brain, central nervous system, kidneys and immune system. Lead in the human body is most harmful to young children under the age of six. In 1993, the state of Missouri began electronically collecting childhood blood lead testing and demographic information and in 2000 all blood lead tests regardless of age or lead level were required to be reported to DHSS. However, data quality issues continue, for example 42% of the blood test reports do not include the race of the patient. The current CDC recommendation is to target high-risk areas within the state for childhood lead poisoning prevention testing and follow-up services. [Missouri Senate Bill 266](#), passed in 2001, required DHSS to promulgate rules and regulations to establish a statewide screening plan. The rules and regulations define criteria for establishing geographic areas in the state considered to be at higher risk for lead poisoning, outline blood lead testing requirements and protocols; and define lead testing follow-up and treatment procedures.

The primary source for lead exposure for children in Missouri is from deteriorated lead based paint that was banned for residential use in 1978. The highest risk of lead exposure for children is found in homes built before 1950 which was when most paint contained a high percentage of lead. Twenty-four percent (24%) of the housing stock in Missouri was built before 1950 and sixty counties in Missouri have greater than twenty-four percent (24%) pre-1950 housing stock. In the past five years of blood lead data analysis, the percentage of children poisoned (blood lead levels ≥ 10 µg/dL) has decreased from 11% (5,092) to 4% (3,087) while the number of children tested has increased 52% from 46,715 in 1999 to 70,904 in 2003. The percentage of the population under six years of age increased from 15% in 2002 to 16% in 2003. The geographic area with the highest risk for childhood lead poisoning remains St. Louis City, which comprises 6% of the population of children under six in the state; however, they report 53% of the lead poisoned children in Missouri and 70% of their housing stock was built prior to 1950. Additional details on childhood blood lead testing data by county and the map and criteria establishing geographic areas requiring universal testing versus targeted testing may be viewed on the Missouri Childhood Lead Website located at: <http://www.dhss.state.mo.us/ChildhoodLead/>. Geographic areas of the state are designated for Universal Testing which requires annual testing for children less than six years of age or Targeted Testing that requires Medicaid children to be tested at 12 and 24 months of age. All children less than 6 that live in a targeted testing area are required to answer an annual screening questionnaire; testing is based upon positive responses.



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Section C - Environmental Surveillance

Missouri Childhood Lead (continued)

The development of the statewide testing plan designating areas of high risk, the requirement from Department of Social Services/Division of Medical Services that all Medicaid eligible children be tested at 12 and 24 months of age and inclusion of blood lead testing as a performance measure for selected counties in their Department of Health and Senior Services (DHSS), Maternal Child and Family Health contracts has made a significant contribution to the number of children tested in Missouri. **Figure 7C** provides a more detailed examination of testing patterns by the age of the child. While testing is increasing in many areas of the state, most notably in the non-metro areas, there continues to be a significant number of EBL children statewide. Continued outreach and education on testing criteria will, hopefully, increase the testing and effective case management of EBL (elevated blood lead level children), case management and environmental assessment and remediation of properties with identified lead hazards throughout the state.

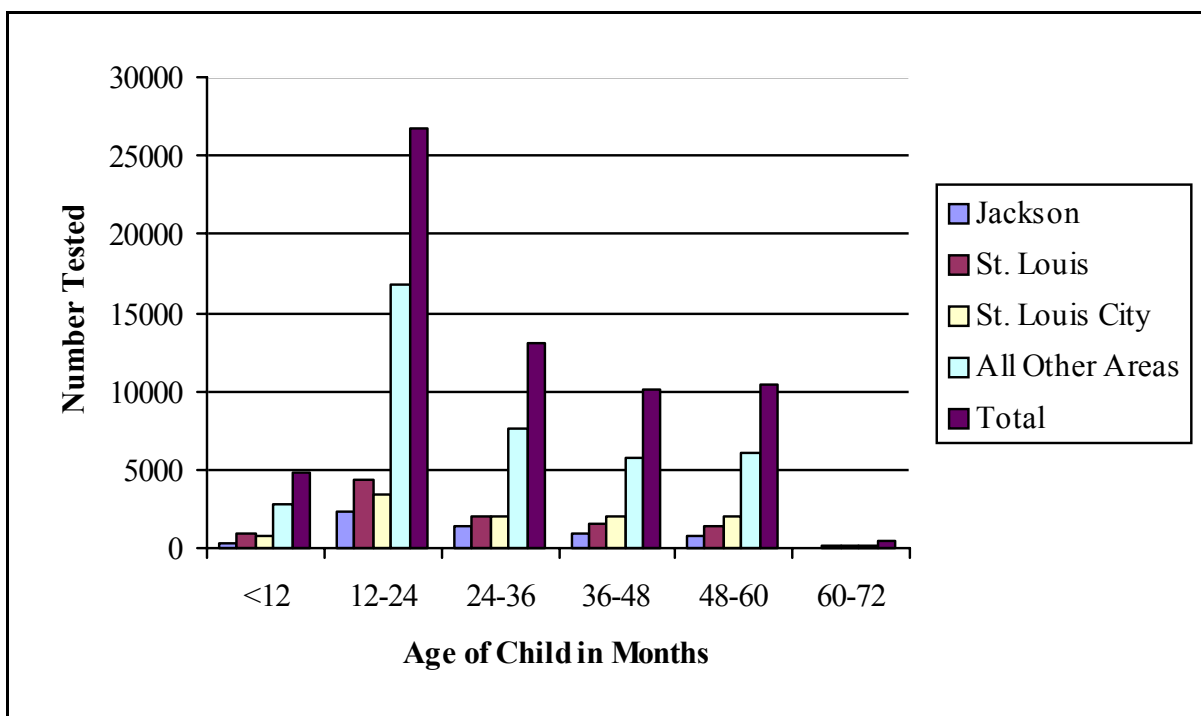
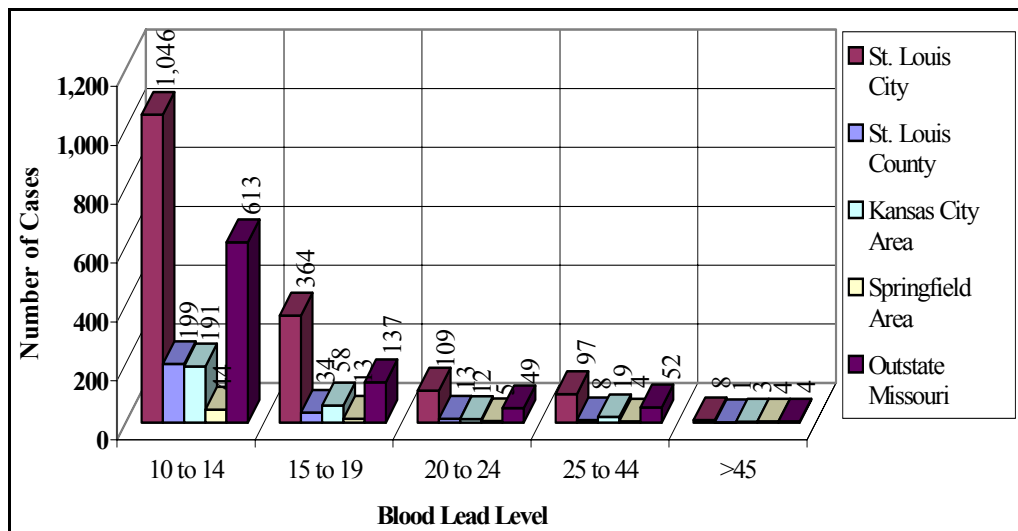


Figure 7C - 2003 Cohort Analysis by Age of Child in Months

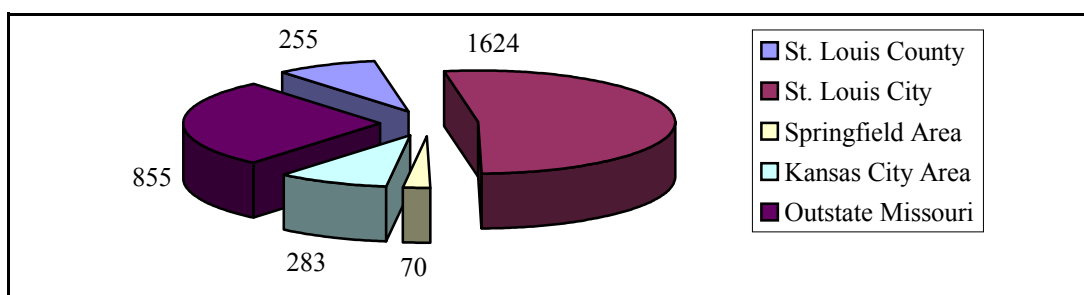
Section C - Environmental Surveillance

Missouri Childhood Lead (continued)



Jackson, Clay, Platte and Ray counties comprise the Kansas City Area and Outstate Missouri includes all other remaining counties.

Figure 8C - 2003 Elevated Blood Lead Levels in Children



Jackson, Clay, Platte and Ray counties comprise the Kansas City Area and the Outstate Missouri portion of the above chart includes all other remaining counties.

Figure 9C - 2003 Elevated Blood Lead Levels in Children (greater than or equal to 10 micrograms/deciliter)

Additional Information

[Centers for Disease Control
Lead Web Site](#)

[Missouri Calendar Year 2003 Testing by County
of Residence](#)

[Medline Plus - Lead Poisoning](#)

[Missouri Calendar Year 2003 County Rates of
Elevated Blood Lead Levels](#)

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Section C - Environmental Surveillance

Hazardous Substances Emergency Events Surveillance

A total of 430 events meeting the Hazardous Substances Emergency Events Surveillance (HSEES) case definition were reported during calendar year 2003. Events occurred in 72 counties including the City of St. Louis (**Figure 10C**). Of the 430 events, four were threatened releases, one was a combination of actual and threatened release, and the remaining 425 were actual releases.

Of all reported events, 52.3% (n=225) occurred at fixed facilities and 47.7% (n=205) were transportation-related. The most common fixed-facility events in which only one area was involved include indoor, non-industrial, living (residence) areas (24.4%, n=55); indoor, non-industrial, non-living areas (22.2%, n=50); and storage areas above ground (16.9%, n=38). Two fixed-facility events (.9%) involved more than one affected area. The most common transportation events, 182 (88.8%), occurred during ground transport (e.g., tanker truck, non-tanker truck, van, or automobile) and 21 (10.2%) involved transport by rail. The remaining 2 events occurred during air transport in which was involved a crop duster. It is unknown if the second air transport involved a helicopter or a crop duster.

Methamphetamine-related activities contributed to the total number of events reported with 77 (17.9%) events resulting from methamphetamine production (**Figure 11C**).

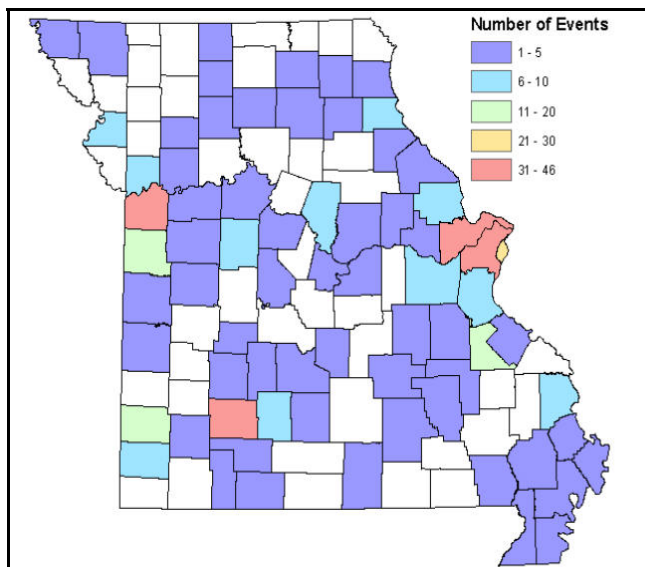


Figure 10C - Geographic distribution of events by county, Hazardous Substances Emergency Events Surveillance, Missouri, 2003.

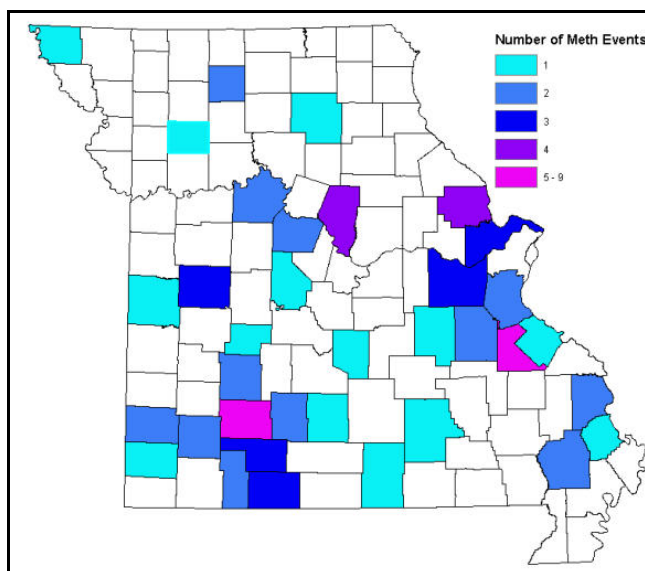


Figure 11C - Distribution of methamphetamine events by county, Hazardous Substances Emergency Events Surveillance, Missouri, 2003.

Section C - Environmental Surveillance

Hazardous Substances Emergency Events Surveillance (continued)

Contributing Factors

Data regarding primary and secondary factors contributing to events were collected of all 430 events. Human error was the primary factor in 248 (57.7%) of the events; of which, 46 (18.5%) were due to responders not having the appropriate Personal Protective Equipment (PPE) when entering a methamphetamine lab. Equipment failure was the primary factor in 94 (21.9%) events. The primary factor was not known for 40 events (9.3%). Intentional or illegal act was the primary factor for 38 (8.8%) events.

Chemicals Released

During 2003, there were a total of 575 substances involved in the 430 events. Of those, there were 567 substances that were actually released during 426 HSEES events. Fixed-facility events involved the release of 321 substances, and transportation-related events involved the release of 246 substances. The 10 substances most frequently released in Missouri for calendar year 2003 were Ammonia, Hydrochloric Acid, Acetone, Sodium Hydroxide, Sulfuric Acid, Paint, Mercury, Ethyl Ether, Methamphetamine Chemicals Not Otherwise Specified (NOS) and Phosphorus (**Table 3C**).

Table 3C - The 10 most frequently released substances, Hazardous Substances Emergency Events Surveillance, Missouri, 2003.

Number	Standardized Substance Name	Frequency
1.	Ammonia	61
2.	Hydrochloric Acid	35
3.	Acetone	24
4.	Sodium Hydroxide	21
5.	Sulfuric Acid	20
6.	Paint	17
7.	Mercury	16
8.	Ethyl Ether	15
9.	Methamphetamine Chemicals NOS*	15
10.	Phosphorus	15
	Total	239

*Not Otherwise Specified



Section C - Environmental Surveillance

Hazardous Substances Emergency Events Surveillance (continued)

Table 4C - Number of substances released in all events and events with victims, by substance category, Hazardous Substances Emergency Events Surveillance, Missouri, 2003.

Substance Category	Total releases		Releases with victims		
	No.	Percentage of total releases	No.	Percentage of all releases with victims	Percentage of releases in substance category
Acids	87	15.3	49	19.9	56.3
Ammonia	62	10.9	26	10.5	41.9
Bases	38	6.7	14	5.7	36.8
Chlorine	17	3.0	10	4.1	58.8
Other inorganic substances	79	13.9	38	15.4	48.1
Paints & dyes	19	3.3	2	0.8	10.5
Pesticides	35	6.2	13	5.3	37.1
Polychlorinated biphenyls	8	1.4	0	0.0	0.0
Volatile organic compounds	90	15.8	45	18.3	50.0
Other, not otherwise specified	43	7.6	23	9.3	53.5
Mixture	34	6.0	11	4.8	32.4
Formulations	0	0.0	0	0.0	0.0
Hetero-Organics	3	0.5	0	0.0	0.0
Hydrocarbons	7	1.2	3	1.2	42.9
Oxy-Organics	32	5.6	12	4.9	37.5
Polymers	12	2.1	0	0.0	0.0
Unknown **	1	0.2	0	0.0	0.0
Total *	567	100%	246	100%	43.4

*Total exceeds number of events because events in which more than one substance was released were counted more than once.

**A category has not been assigned for Biuret of Hexamethylene Diisocyanate.

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Section C - Environmental Surveillance

Hazardous Substances Emergency Events Surveillance (continued)

Of the 16 categories into which HSEES substances were grouped, the categories of substances most commonly released in fixed-facility events were acids (17.1%, n=55), volatile organic compounds (15.9%, n=51) and ammonia (15.6%, n=50). In transportation-related events the most frequently released chemicals were categorized as volatile organic compounds (15.9%, n=39), acids (13%, n=32) and other inorganic substances (12.6%, n=31).

The substances most frequently released may not necessarily be the most likely to result in victims (**Table 4C**). For example, paints and dyes were released during 19 events; however, only two of these events (10.5%) resulted in adverse health effects. Conversely, chlorine was released in only 17 events, and 10 of these events (58.8%) resulted in adverse health effects indicating its greater potential for immediate harm.

VICTIMS

A total of 246 victims were involved in 141 events (32.8% of all events) of which 117 events occurred in a fixed facility. Of the events with victims, 70.2% (n=99) involved only one victim and 14.9% (n=21) involved two victims. Nine events (6.4%) involved five or more victims. Of the total number of victims, 205 (83.3%) were injured during fixed-facility events. For transportation events, 41 people (16.7%) sustained adverse health outcomes.

The population groups most often adversely affected were employees (39%, n=96) and first responders (36.2%, n=89). However, the general public (15.4%, n=38), students (8.9%, n= 22) and hospital personnel (0.4%, n=1) are other groups that were also affected. There were 66 first responder victims in fixed-facility events and 23 first responder victims in transportation-related events. Of these 89 first responder victims, 82 (91%) were police officers injured during methamphetamine-related events (**Figure 12C**).

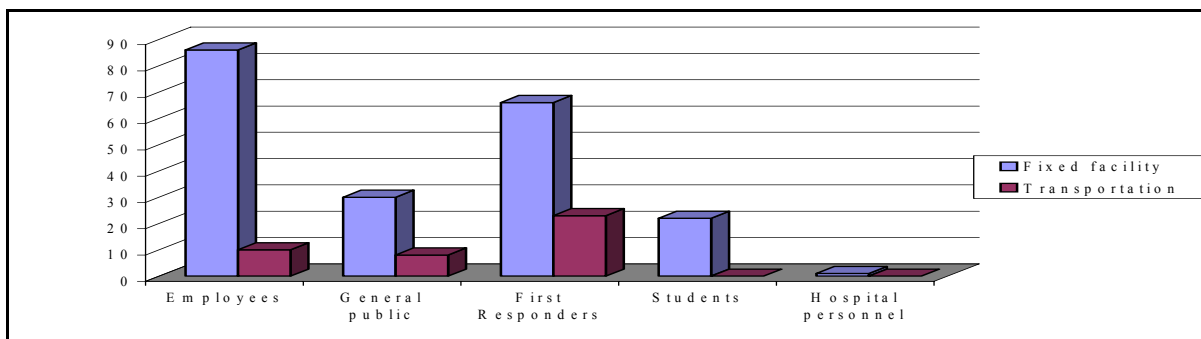


Figure 12C - Distribution of victims by population group and type of event, Hazardous Substances Emergency Events Surveillance, Missouri, 2003.



Section C - Environmental Surveillance

Hazardous Substances Emergency Events Surveillance (continued)

The 246 victims sustained a total of 346 adverse health effects. The most commonly reported adverse health effects were respiratory irritation (28.9%, n=100), headache (21.9%, n=76) and eye irritation (12.4%, n=43). Other reported adverse health effects (37.3%, n=129) were burns (chemical-related, not chemical-related or both), symptoms from carbon monoxide, chemical poisoning, dizziness or other central nervous system (CNS) symptoms, gastrointestinal problems, heat stress, high blood pressure, skin irritation, trauma (chemical-related, not chemical-related or both). Of the 224 victims for who the status of disposition was known, a total of 113 victims (45.9%) were treated at a hospital but were not admitted; 13 (15.8%) were treated at a hospital and admitted. Injuries for 84 victims (34.1%) were reported by an official within 24 hours of the event. The majority of these injuries were self-reported by law enforcement officers responding to and/or collecting evidence from clandestine methamphetamine labs.

Of the three deaths reported in the HSEES system in 2003, one was the result of a motor vehicle accident and the other was a crop duster accident. In both incidents a hazardous substance was released; however, the deaths were caused by trauma from the accidents and not by exposure to the substances. The remaining fatality involved a fire due to a methamphetamine lab that killed a tenant in the neighboring unit.

EVACUATIONS

Evacuations were ordered in 46 events (10.7%). The number of persons evacuated was known for 34 of the 46 events and the median number of persons evacuated was 16 (range: 2-400). The length of evacuation was known for 43 of the 46 events and the median length of evacuation was 2 hours (range: 0.2-96.0 hrs). In four events, an official ordered in-place sheltering and provided instructions regarding precautions. Six individuals self-evacuated in one event before an official evacuation was ordered.

Evacuations were ordered in 5 of the 46 events as a result from methamphetamine-related activity. The number of people evacuated was known in 3 of the 5 events and ranged from 4 to 6. The total number of people evacuated in these three events was 16. Two of the events involving an evacuation were caused by the theft of anhydrous ammonia, two involved active residential methamphetamine labs, and one involved a methamphetamine lab in a hotel room.

Additional Information

[Environmental Health and Hazardous Substances](#)

[Missouri HSEES Program](#)

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Section C - Environmental Surveillance

Carbon Monoxide Poisoning

Carbon monoxide is an invisible, odorless, tasteless, and highly poisonous gas. The burning of fossil fuels such as gasoline, natural gas, kerosene, charcoal, or wood produce the gas. Inside a home, carbon monoxide can be produced from a natural gas-fueled furnace, water heater, clothes dryer, space heater, or range; or fireplace, wood stove, or kerosene heater. The early symptoms of carbon monoxide exposure include headaches, dizziness, weakness, sleepiness, nausea, and vomiting; more extreme consequences include disorientation, coma, convulsions and death. Carbon monoxide poisoning is defined as a carboxyhemoglobin level of $\geq 15\%$, although lower levels can cause symptoms and illness. People suspected of carbon monoxide poisoning should seek immediate medical attention.

Centers for Disease Control and Prevention (CDC) statistics show that each year more than 500 Americans die from unintentional carbon monoxide poisoning, and more than 2,000 commit suicide by intentionally poisoning themselves. In Missouri, there were total of 143 reported poisoning* cases in 2002-2003, with 108 of these resulting in death (**Figure 13C**).

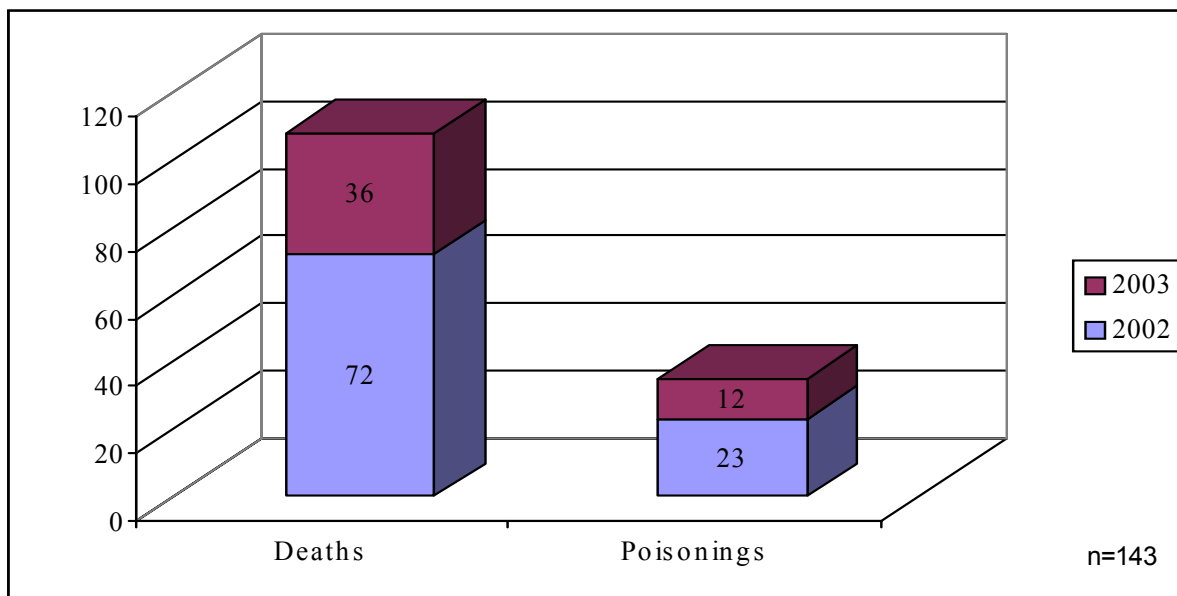


Figure 13C - Carbon Monoxide Poisonings, Missouri 2002-2003

* Case definition: carboxyhemoglobin $>15\%$ or death certificate states death due to carbon monoxide poisoning

Section C - Environmental Surveillance

Carbon Monoxide Poisoning (continued)

While physicians and laboratories are required to report cases of carbon monoxide poisoning to their state or local public health agency, many non-fatal carbon monoxide poisoning cases remain unreported. In August 2003, DHSS began receiving death certificate information on all deaths occurring since 2002 that have carbon monoxide poisoning listed as an underlying or contributing cause of death. This greatly increased the number of deaths reported and provided more information on the manner of death. In 2002-2003, of the total 108 carbon monoxide deaths in Missouri residents, 64 (59%) were suicides. There were 40 (37%) accidental deaths, 1 (1%) homicide, and 3 (3%) deaths where the manner was unknown (Figure 14C).

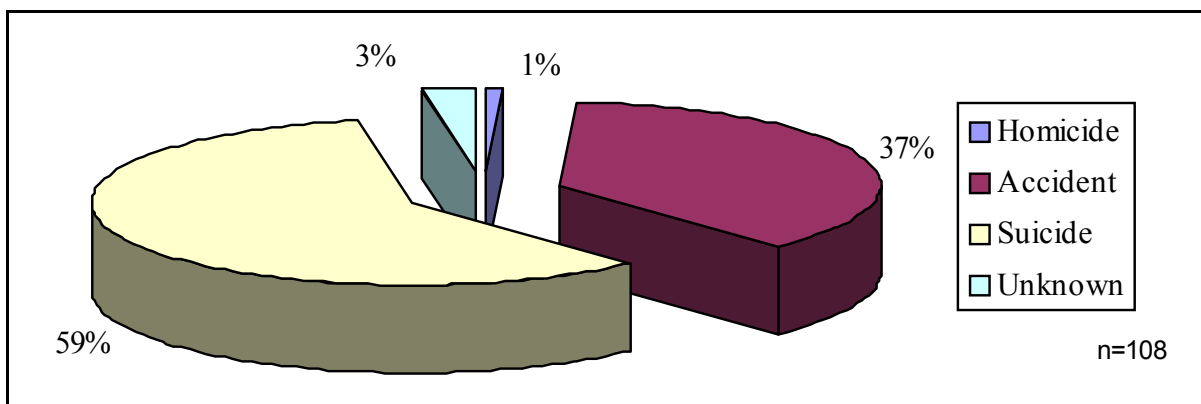


Figure 14C - Carbon Monoxide Fatalities by Manner of Death, Missouri 2002-2003

Additional Information

[Centers for Disease Control
Carbon Monoxide Poisoning Web Site](#)

[Medline Plus - Carbon Monoxide
Poisoning](#)

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Section C - Environmental Surveillance

Hyperthermia

DHSS monitors high temperatures and humidity across the state in an effort to prevent heat-related illness and death. The elderly and the chronically ill are more vulnerable to the effects of high temperatures. They perspire less and are more likely to have health problems requiring medications that can impair the body's response to heat. Many prescription medications make individuals more sensitive to the heat. Some of these medications include anti-psychotics, major tranquilizers, antihistamines, over-the-counter sleeping pills, antidepressants, heart drugs and some anti-Parkinsonian agents. Each year many Missourians suffer from heat-related illnesses, with some cases resulting in death. During prolonged periods of high temperatures air conditioning is the best preventive measure.

DHSS initiated statewide hyperthermia death surveillance in 1980 in response to a summer heat wave that resulted in the death of 295 individuals. Missouri's heat-related deaths are primarily concentrated in urban, more densely populated areas of St. Louis City, St. Louis County and Jackson County (Kansas City) (**Figure 15C**). From 2000 through 2003, of the total 105 deaths, there were 68 (65%) deaths in these metropolitan areas. Rural deaths accounted for 37 (35%) of deaths. This figure includes the death of one Kansas resident while at a Missouri recreational area in August, 2003.

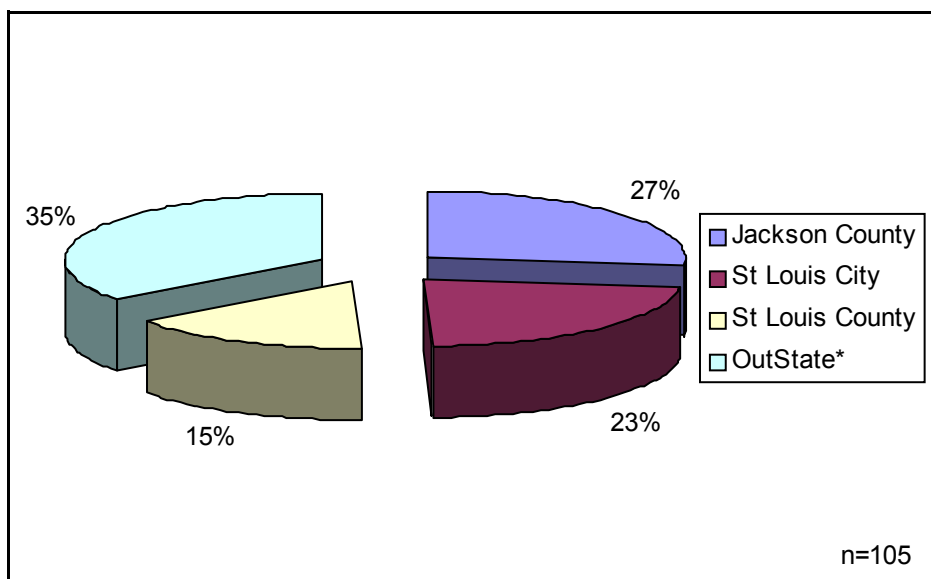


Figure 15C - Hyperthermia Deaths by Geographic Area, Missouri 2000-2003



Section C - Environmental Surveillance

Hyperthermia (continued)

During the summer of 2003, there were 17 heat-related deaths in Missouri. All heat-related deaths are confirmed by review of death certificates, ensuring heat or hot environment is a contributing or principal cause. The number of deaths during the summer months has varied over the years in response to the severity and length of hot periods (**Figure 16C**).

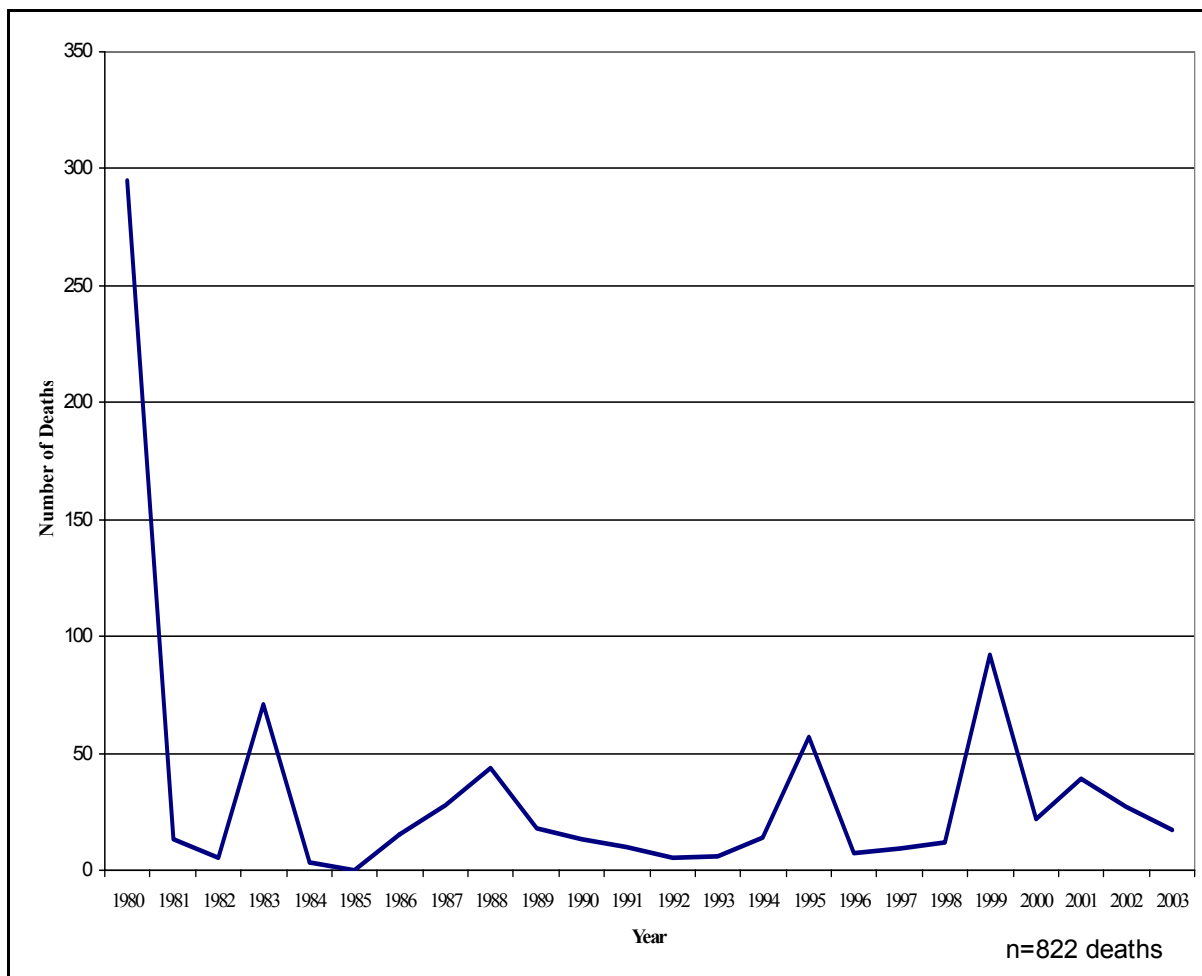


Figure 16C - Missouri Hyperthermia deaths 1980-2003

Section C - Environmental Surveillance

Hyperthermia (continued)

The greatest number (223) of deaths 1989-2003 have been of people age 65 years and older. Deaths in this population are often in individuals living alone who have other complicating medical conditions. However, since 1999 there has been an increased number of deaths in younger age groups, particularly age 45-54 years. Of the total 50 deaths of persons age 45-54 which occurred 1989-2003, 35 of the deaths have occurred since 1999. These deaths often have other contributing causes such as physical activity, alcohol or illegal drug use (**Figure 17C**). White males are the most frequent victims of heat-related illness resulting in death (**Figure 18C**). Missouri is the only state which conducts on-going statewide surveillance for natural heat related illnesses and deaths.

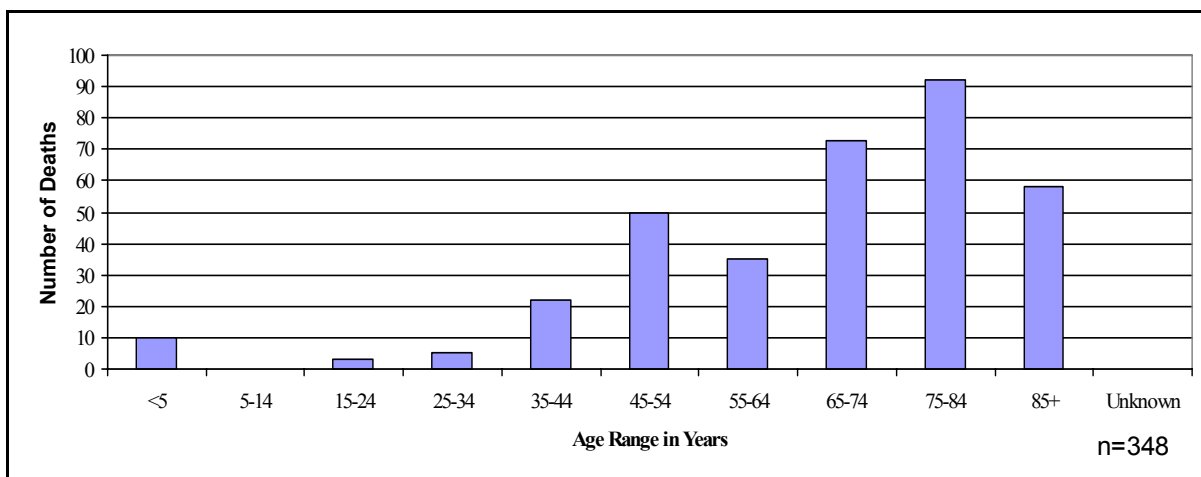


Figure 17C - Hyperthermia Deaths by Age, Missouri 1989-2003

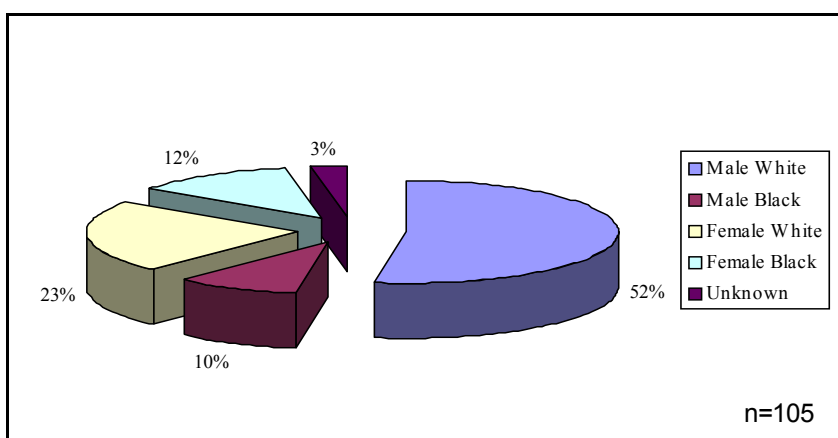


Figure 18C - Hyperthermia Deaths by Race and Sex, Missouri 2000-2003

Additional Information

[Centers for Disease Control
Hyperthermia Web Site](#)

[Medline Plus - Hyperthermia](#)

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Section C - Environmental Surveillance

Hypothermia

Hypothermia is defined as a cold injury associated with a fall of body temperature to less than 94.1°F which results from unintentional exposure to a cold environment. In Missouri, 371 people have died from the cold during the winter months since 1979 when data collection of hypothermia first began in Missouri (**Figure 19C**). There were 28 deaths during the 2002-2003 cold weather season and 20 deaths during the 2003-2004 season (preliminary data).

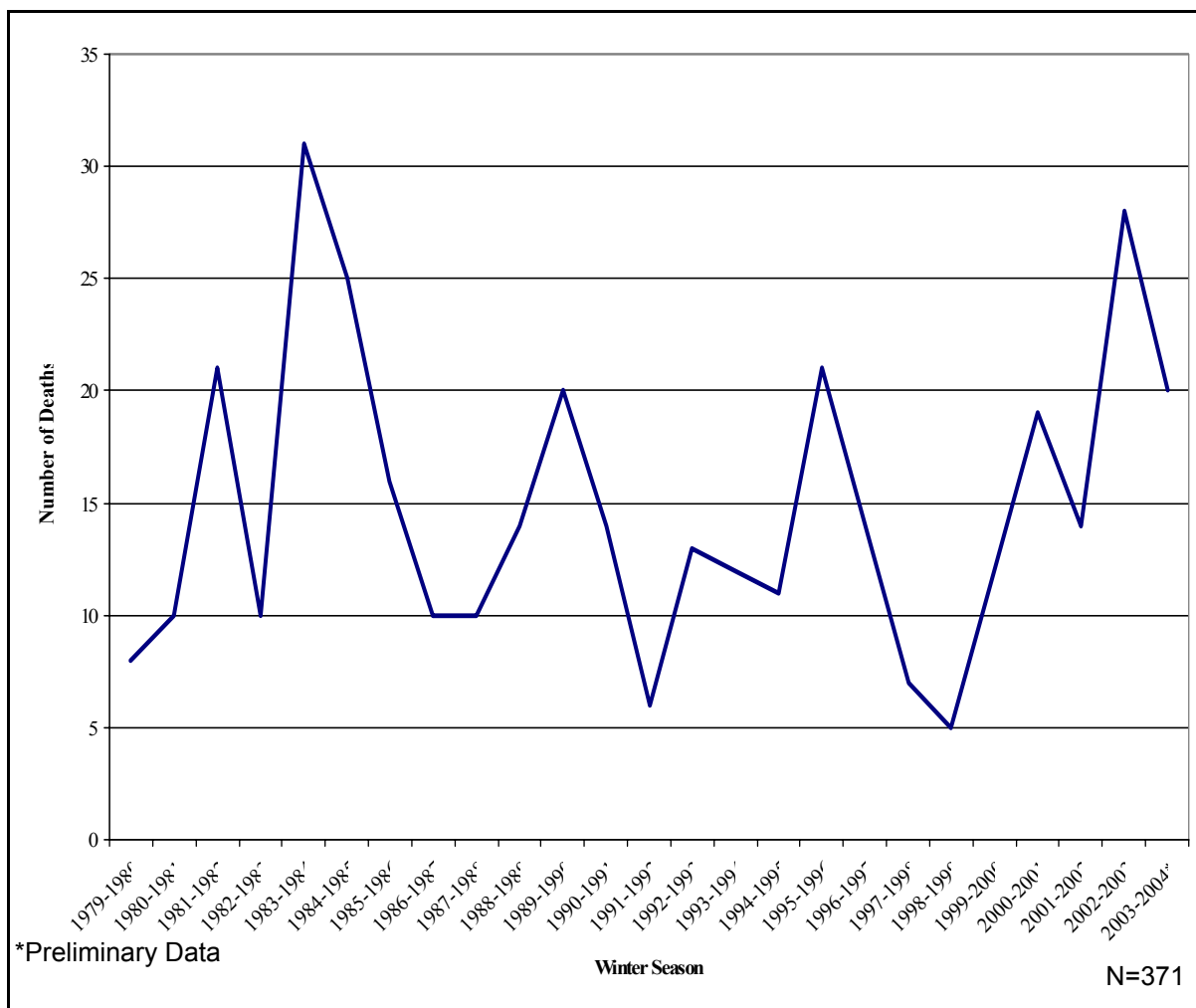


Figure 19C - Hypothermia Deaths, Missouri Winter Seasons 1979-2004

Section C - Environmental Surveillance

Hypothermia (continued)

The elderly are more likely to be victims of cold-related illness resulting in death (**Figure 20C**). Too often handicapped or elderly individuals fall outside their homes and are unable to reach shelter or help. During the cold weather seasons 1989-2004 (preliminary data), 110 (51%) hypothermia deaths were of people age 65 years and older. Deaths of individuals between the ages of 25-64 often have a contributing cause of substance abuse or a debilitating medical condition. Since 1989, there have been 97 (45%) hypothermia deaths in this population. Fortunately, deaths in people age <25 years are rare, accounting for only 7 (3%) of the total 214 Missouri hypothermia deaths for the 1989-2004 (preliminary data).

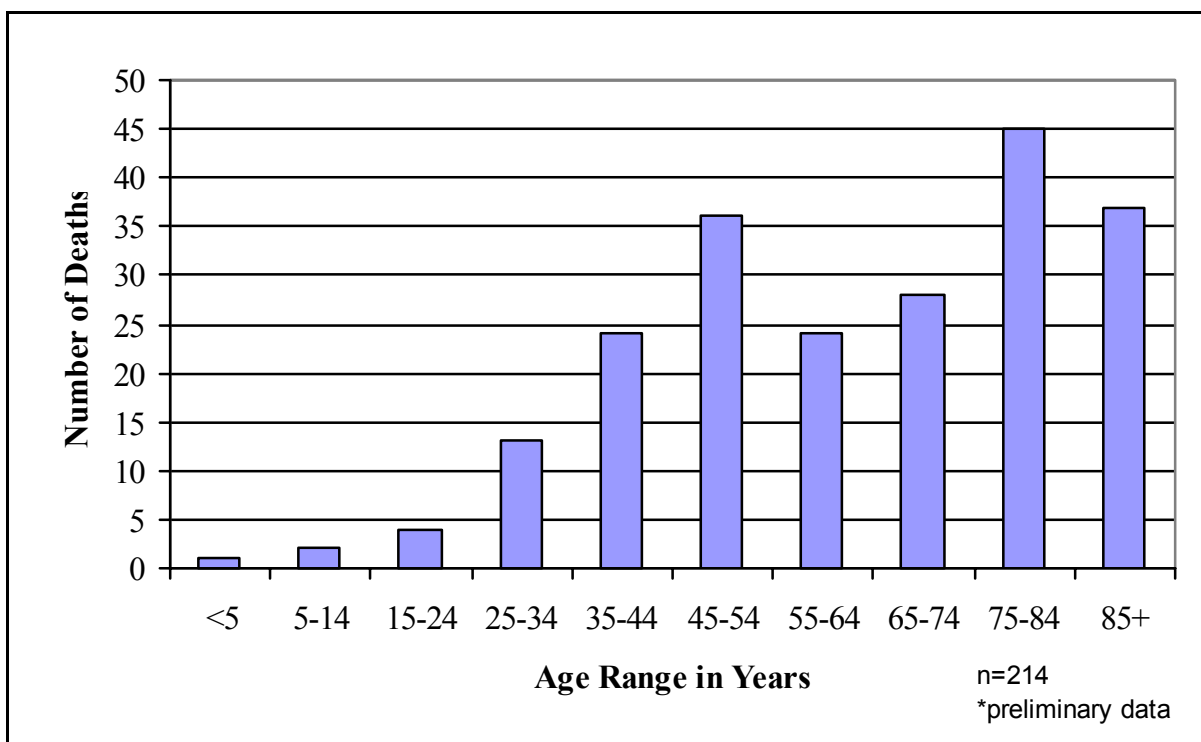


Figure 20C - Hypothermia Deaths by Age, Missouri Winter Seasons 1989-2004

Section C - Environmental Surveillance

Hypothermia (continued)

From cold weather winter seasons 2000 through 2004 (preliminary data), the largest number of deaths were among white males comprising 48% (n=39) of the 81 total cold related deaths (**Figure 21C**). The majority, 46 (57%), of deaths occurred in the non-metropolitan areas of Missouri (**Figure 22C**). Jackson County had 18 (22%) deaths, St Louis County had 9 (11%), and St Louis City had 8 (10%) of the total 81 hypothermia deaths since 2000. Missouri is the only state that conducts on-going statewide surveillance for natural cold related illnesses and deaths.

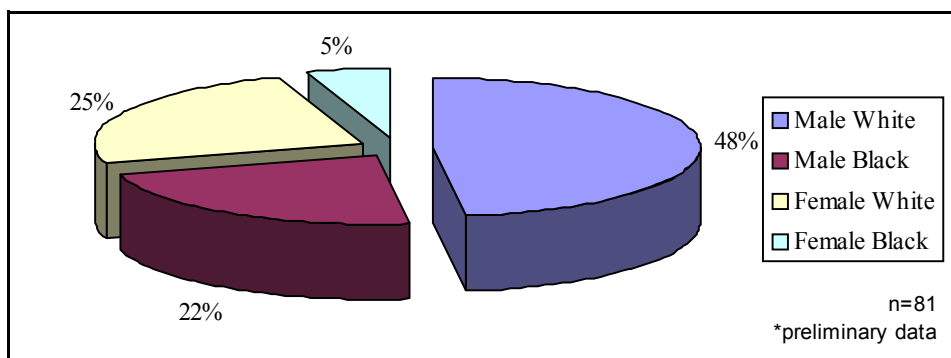


Figure 21C - Hypothermia Deaths by Race and Sex, Missouri Winter Seasons 2000-2004

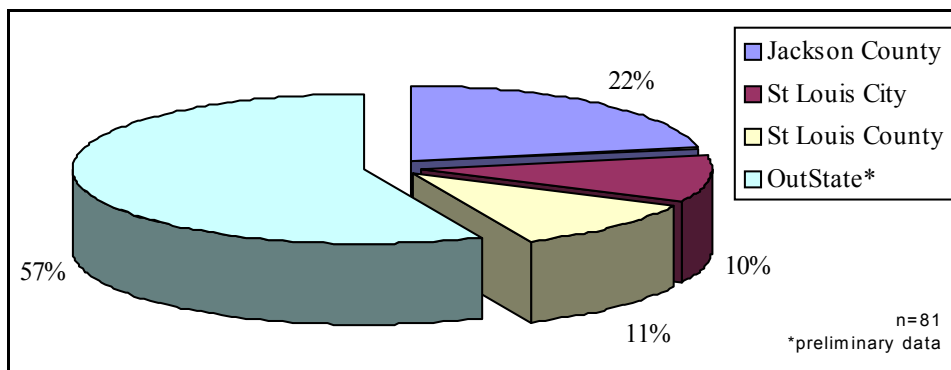


Figure 22C - Hypothermia Deaths by Geographic Area, Missouri Winter Seasons 2000-2004

Additional Information

[Centers for Disease Control
Hypothermia Web Site](#)

[Medline Plus - Hypothermia](#)

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